THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 38 OCTOBER, 1935 No. 1

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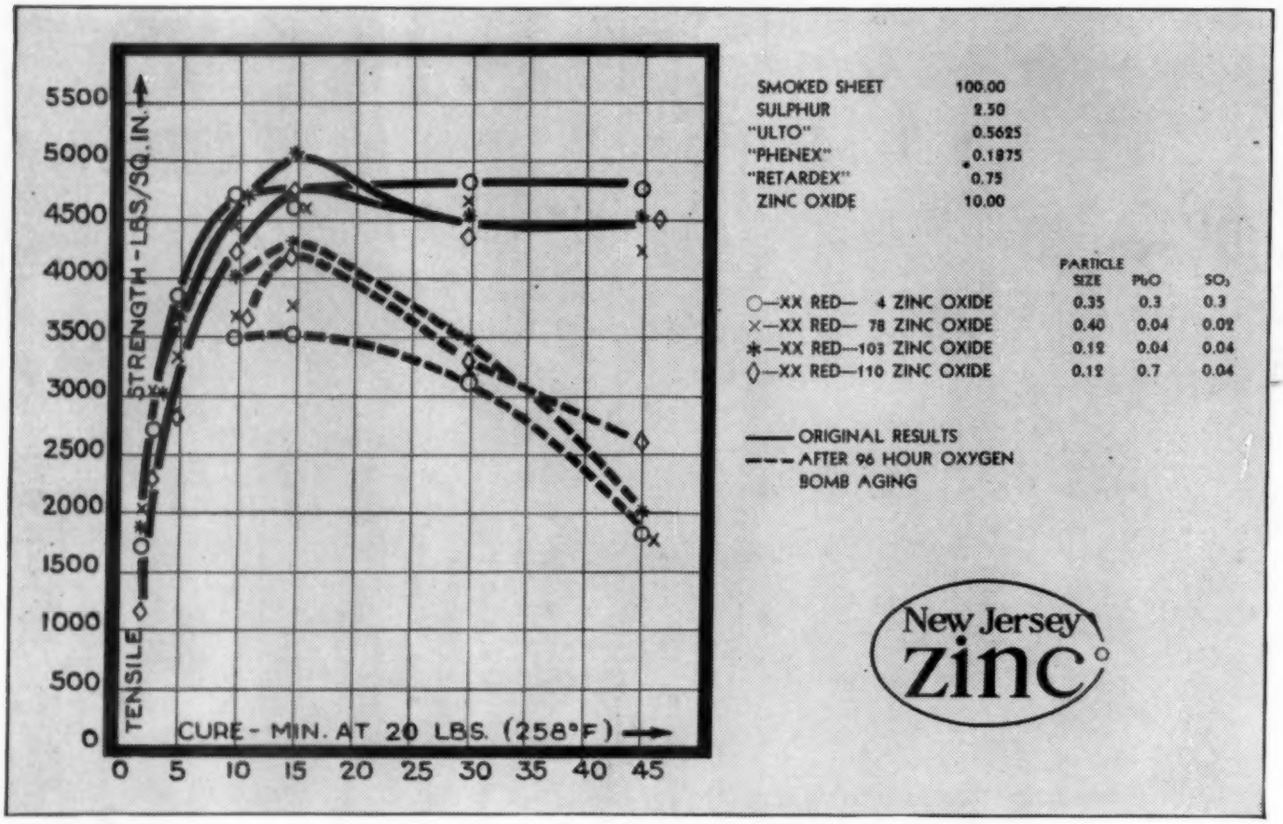
"Fast" and "Slow" Curing Zinc Oxides with "ULTO", "PHENEX" and "RETARDEX"



No. 43 of a series of charts showing a comparison of "FAST" and "SLOW" curing Zinc Oxides with typical accelerators.

XX Red 4, XX Red 78 and XX Red 103 on original physical properties with this particular accelerator ratio, give results which are fairly comparable. XX Red 103, however, produces somewhat higher tensiles and shows a tendency to a sharp-peak curing curve. XX Red 110, probably on account of its lead content, is slightly retarding. These differences are further indicated in the 96 hour oxygen bomb aging results.

(See also charts 33 and 38 in The Activator)

UNIFORM QUALITY ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

THE RUBBER AGE

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Vol. 38 OCTOBER, 1935 No. 1

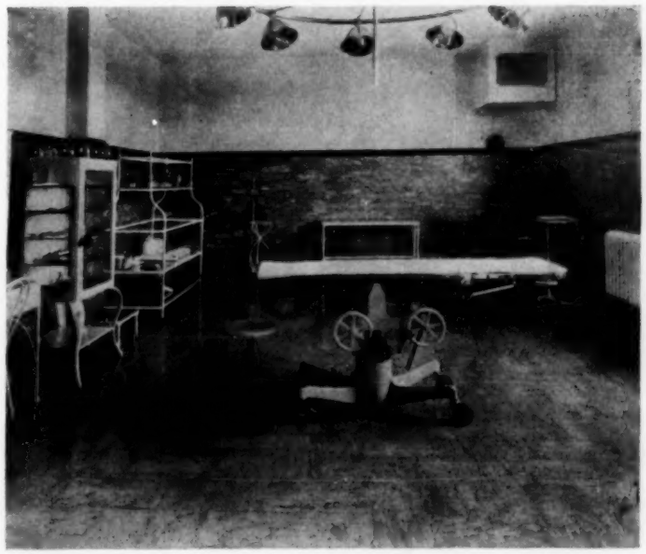
Rubber in Modern Hospitals

By John Lipani

THERE is absolutely no argument with regard to the statement that the growth of hospitals has been a boon to mankind. It is as equally true that the development of rubber articles has been a boon to hospitals. Since the discovery of methods of vulcanization perfected by Charles Goodyear in 1839, the use of articles of rubber construction has spread widely in the hospital field, not only those of a prosaic nature, such as water bottles, finger cots, and the like, but also many of a much wider value.

The value of rubber flooring for hospitals is immediately visualized. Not only for its values of resiliency and color, but for its practical value in wards and rooms, and, from a standpoint of psychology, for its brightening effect on patients and invalids. In the corridors and wards rubber flooring, of either straight or tiled construction, readily resists the effects of rolling equipment, does not dent, and has been proved to outlast a number of flooring materials of other types.

In recent years color has come to play an important part in the modern hospital, not only in corridors and wards and rooms for psychological purposes mentioned, but also in the lobby and entrance chambers where the incoming patient receives his first, and generally lasting, impression. Especially is this true of the maternity hospitals. Without sacrificing the dignity or efficiency so essential to modern hospitals, it is possible to obtain tantalizing effects with rubber tile. From a hygienic standpoint rubber flooring has no competition whatsoever. Any approved water emulsion wax applied keeps rubber flooring spotless. The principal advantages of rubber flooring (or tiling) to hospitals may be summed up in their hygienic, silent and wearable characteristics.



Rubber wainscoting and flooring combine to make this operating room of the Forest Hills Hospital, Boston, one of the finest in the country.

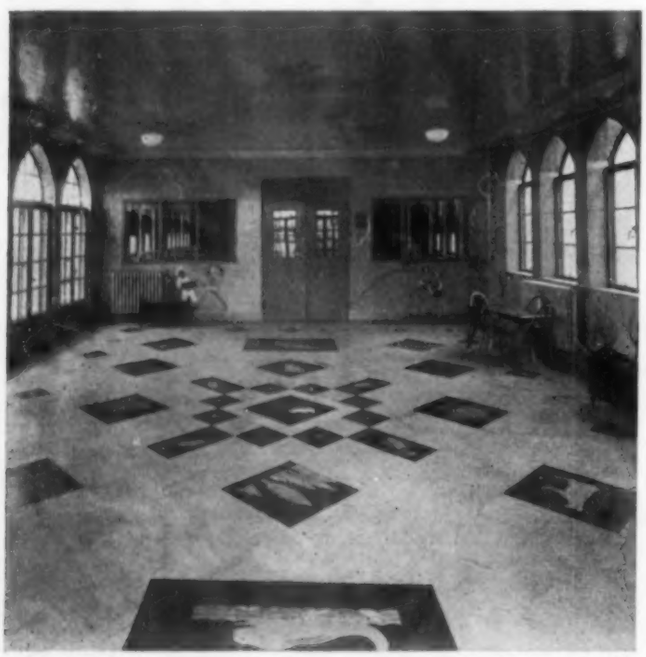
It is also possible to add distinguishing touches to certain departments, especially children's wards and nurseries, by means of specially-designed inlays. Stedman, for instance, produces such inlays for tiny patients designed with animals, birds, and nursery rhyme characters easily

recognized by children. An excellent example of such an installation is found in the Bobs Roberts Memorial Hospital, in Chicago, where a playroom set aside for recuperating children features rubber inlays of animals, birds and trees. The effect on the recuperation powers of children of such a bright and cheerful room may easily be imagined.

Before we make mention of the myriad of rubber articles used in the actual business of treating patients in the hospital, let us consider other uses of rubber in and about the interior. One of the more recent uses of rubber in this connection is the development of rubber wall paneling, or wainscoting. The principal supplier of this type of paneling is the Stedman Rubber Flooring Company, who have made innumerable installations in leading hospitals. Hospital walls are constantly exposed to the threat of being scarred or fractured by mobile hospital equipment. The treatment of these walls with rubber wainscot, either in panel or strip form, prevents such abuse, in addition to adding a more hygienic air to the rooms. Generally, as in the case of Stedman rubber wainscot, the panels or strips are either ⅛ or 3/16 of an inch in thickness. With a wainscot cap and cove base this rubber paneling, which is applied directly to the walls, makes for a complete and attractive unit. An excellent example of a complete Stedman installation is found in the Operating Room of the Forest Hills Hospital, in Boston, where rubber wainscoting and rubber flooring combine to make one of the most attractive, and practical, operating rooms in this country.

One rubber organization, in recent years, has perfected a Ray Proof rubber for the walls of X-Ray, Cystoscopic, and Fluoroscopic rooms, which is the most modern method of X-Ray protection. The scientifically compounded rubber material acts as a positive light shutter in place of sheet lead or barium plaster, and answers to all the requirements needed. Installation of this wall covering in the three types of hospital rooms named furnishes a three-way service: X-Ray protection, decorative wall covering (and also flooring), and absorption of high frequency noises.

It might be well to mention at this point that rubber flooring and wall paneling in hospitals has recently been found advantageous from still another standpoint than those already mentioned, viz: the use of rubber flooring reduces the risk of electrical shocks, particularly in operating rooms where modern electrical contrivances are used, since rubber is a non-conductor of electricity.



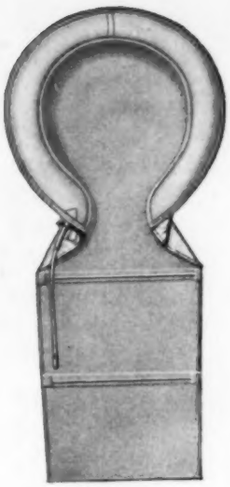
The children's playroom of the Bobs Roberts Memorial Hospital, Chicago, features Stedman rubber inlays of animals, birds and flowers.

The Faultless hot water bottle for hospital use features a smooth front (arrow) with a velvety sponge rubber back.

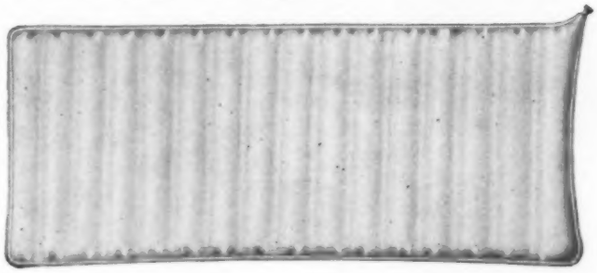
Rubber again plays a part in the hospital in the protection of doors and stairs. There are three general methods used for door protection, these being the covering of the complete door with a colorful sheet of rubber making for a rich, decorative effect; by covering the lower half of the door with a rubber tile to equal a wainscot treatment (hospital doors being particularly subjected to foot-pushing by hand-laden nurses and attendants); and by the use of what are known as "push-and-kick" plates which are placed at strategic points of the door most subjected to foot treatment. Stair treads, of course, are used to furnish the same protection as provided to any ordinary stair to protect them from foot traffic and to provide a sure foot grip.

Turning from these practical, and in many cases economical, uses of rubber in modern hospitals, to consider the role rubber plays in making the patient's lot easier, the first item that literally presents itself is rubber sheeting. In an effort to standardize this material the American Hospital Association, in conjunction with the National Bureau of Standards, in 1931, devised a commercial standard in cooperation with the Rubber Manufacturers' Association, which has become almost nation-wide in the United States. The approved standard in 1932 covers the chemical and physical requirements of rubber sheeting of both single and double coated types. Two colors only (with deviations) were adopted, these being white and maroon or cream colors. It specifies the construction of sheeting as being made from a cotton fabric coated with rubber compounds, the compound used to contain not less than 30% of rubber. Three sizes, 36, 45 or 54 inches in width, were recommended. Resistance to steam and phenol, and tests for waterproofness and tensile strength, the figures for which are well known by both sheeting manufacturers and hospital purchasing agents, were stressed. Rubber sheeting, of course, is furnished in rolls of various lengths from 25 to 60 yards.

There are two popular methods in vogue of manufacturing hospital rubber sheeting, viz: the calender process and the spreader method. By the former process, the rubber is sheeted out on huge steel rolls and then pressed to the prepared fabrics. The fabrics are then vulcanized, the vulcanizing ingredients being incorporated in the com-



Above: Davol flexible throat bag. Right: U. S. reversible operating cushion (Kelly style). Below: U. S. inflatable air bed for hospitals.



pound. By the latter, or spreader, method thin layers of rubber are successively applied by means of a "doctor" knife, until the desired gauge or thickness is obtained (0.014 or .020 inch). The coating is later cured by the sulphur chloride method, the excessive acid being neutralized by an ammonia bath.

In recent years a new type of hospital sheeting has made its appearance, known as "Spongegrip," a product of the Stedfast Rubber Company. This product is termed the "cushioned" hospital sheeting. Made by a patented process Spongegrip sheeting has a smooth, velvety upper surface and a specially constructed sponge rubber under surface. It is literally cushioned with thousands of tiny air cells to acquire a cooling effect. When applied on hospital beds this sponge sheeting remains smoothly in place, and does not wrinkle or crease, since the sponge rubber surface firmly grips the upper surface, the sides, and the under surface of the mattress. Straps, hooks, rods, clamps, cover-alls and ticking, often used to keep sheeting properly in place to permit easy resting by the patient, are all done away with by this new cushioned sheeting which also permits the patient to rest comfortably on what practically amounts to an air cushion. According to Stedfast the features of Spongegrip are that it will not slip, wrinkle, peel or crack, and is guaranteed for three years. It has been thoroughly tested, samples having been boiled for a period of three hundred hours in the Stedfast laboratories, at the end of which no deterioration was noted in them.

The care of rubber sheeting is an important function in every hospital, since proper care extends the life of the sheeting to a large extent. DuPont recommends three processes in the sterilizing of rubber sheeting, agents of an oily nature not being included. These processes include: (1) the use of corrosive sublimate (Bichloride of Mercury); (2) sterilization by immersing in an autoclave under 15 pounds steam pressure for a 20-minute period; (3) the use of a 5% phenol solution as a weak sterilizing agent. Blood, albumin and perspiration are all damaging to rubber sheeting, therefore sterilization is most important.

In the last year or so DuPont has incorporated DuPrene in the manufacture of its hospital sheeting. This synthetic product has been proven to be superior in various essential respects to sheeting made of natural rubber. DuPrene resists many substances far better than natural rubber, and is expected to be rapidly adopted for use in hospital articles of rubber construction in the next few years.

Among hospital supplies fitting into a general category are such rubber items as water bottles, ice caps, throat bags, syringes, atomizers, breast pumps, colon tubes, bed pans, stomach tubes, operating or dissecting gloves, air cushions, air beds, inflating sets and operating cushions. The general run of these articles require no further explanation than their mention, since they conjure up immediately a visual picture of their style and type, but a few merit special attention.

For instance: United States Rubber's operating cushion (Kelly Style) is a reversible cushion, made of maroon rubber, with a cloth insertion for strength and durability. Metal trays in the apron of the cushion permit proper shaping when necessary. Each cushion is supplied with an inflating set, also made of rubber. The apron length of the cushions is 25 inches, while the outside diameter varies from 14 to 24 inches. A throat bag, designed to fit snugly under the chin, is molded from red rubber, 4″x12″ in size, and furnished with a nickel plated cap. Another U. S. throat bag (termed the Excelsior) is made of maroon rubber, cloth inserted, with a brass collar, and is easily adjusted to the throat or body with loops provided on top and bottom, and both sides. Still another style, the Royal, is circular in construction with an outside spring on the outer surface which holds it firmly against the patient's throat. A tonsil throat bag is furnished with tape for adjustment around the throat. Practically all of the hospital rubber sundries featured by the United States Rubber Company include the cloth inserted rubber construction previously mentioned.

Included among other rubber articles for use on and in easing the patient may be included catheters, generally of red rubber tubing about 16 inches long. The Faultless

Corridor in the University Hospital, Cleveland, in which is laid some 600 feet of Goodyear rubber tiling, in light paisley sections.

Rubber Company manufactures catheters having one end shaped like a funnel, with an eyelet on the other end. This company also makes sponge rubber invalid cushions, molded in one piece without seams. Colostomy pouches of rubber, equipped with straps, are produced by the Davol Rubber Company. Davol also makes a special surgeon's syringe of tan rubber, shaped in the form of an oval, which comes equipped with tubing, the entire accessories being put up in a easily-portable case. Pessaries, either flat or inflated, are now being made of sponge rubber and hard rubber, in white or red. Round pessaries range from 2¼ to 3¾ inches in width, while hard rubber pessaries, and others of various odd-shapes, are available in sizes from 1⅜" to 2¾" to 2 9/16" to 3⅞". These are but a few of the many.

Some Uses of DuPrene

Before going into the next phase of rubber in modern hospitals it might be well to mention some additional uses being made of DuPrene. It is being used in the making of domes, or hypodermic seals, for containers of serums and other fluids used hypodermically. Also in the manufacture of bulbs for medicine droppers. The synthetic rubber does not disintegrate under the action of many of the fluids which normally affect natural rubber. The value of preventing particles of the bulb of the dropper from getting into drops for the eyes, nose or throat is instantly recognized. Additional hospital products are being made from DuPrene with current experiments being conducted for the manufacture of surgical gloves.

From a standpoint other than hygiene, durability, economy, and in the use of articles used to treat the suffering, rubber has still another useful purpose in the modern hospital, viz: from the standpoint of quietness and silence, so essential to the well-being of the recuperating patient and so necessary to the incoming sufferer. Modern hospitals are rapidly adopting anti-noise campaigns within their own walls by such simple means and methods as the covering of table tops, counters and shelves with plain rubber sheeting cut to proper lengths. The jarring noises of medicine bottles and sundry accessories is severely limited in this manner.

Buckets, water jars, refuse bins, milk churns, and similar articles, all used in the normal operation of a large or medium-sized hospital are being fitted with rubber rims. Milk bottle carriers are now equipped with rubber-coverings. Some hospitals are carrying their anti-noise campaign into the lavatory and adopting lavatory rubber seats. At present there are two separate types of these seats available to the hospital field, one made of ebonite and the other of soft rubber. Rubber seats of this nature are non-porous, and therefore non-absorbing and extremely hygienic besides being noiseless.

Additional Rubber Applications

There are still other instances of rubber in the modern hospital. Bed bumpers made of tough, resilient rubber which fit around the bed legs just above the regular casters for one. Flower vases of all-rubber construction (such as supplied by Stedman) is another. These vases are made with non-collapsible walls and a sealed surface, and are practically indestructible. Water-proof, stain-proof and fire-proof rubber trays, in a variety of colors, are also made by Stedman for a number of purposes including its use as a glass coaster, ash tray, or pin and clip dish. And then there are innumerable rubber products for use in the commissaries of hospitals valuable from both hygienic and silent standpoints, such as dish drainers, drain mats, rubber-covered garbage pails, and so forth.

Before concluding any subject dealing with uses of rubber in the modern hospital mention should be made of the rapid development in the use of articles of a sponge rubber nature, mention of which has been in the Spongegrip type rubber sheeting featured by Stedfast. Sponge rubber is known to be extremely hygienic and will not harbor vermin,which is one of the primary reasons for quick adoption of sponge rubber products in hospitals. One of the leaders in this movement is the Dunlop Rubber Company who have perfected a process under which they are producing rubber articles under the name of "Dunlopillo." Very light, one-piece seatings and mattresses are made by this new method. The Baltimore City Hospital, at Baltimore, Maryland, recently ordered a large number of these sponge rubber mattresses which are said to be exceptionally light in weight and extremely comfortable. Chairs and lounges made with Dunlopillo are also being installed in hospitals, since the comfort they provide is doubly welcomed by recuperating patients.

It would be impossible to make mention of or describe all of the hundreds of rubber products in use in hospitals in this country, not alone throughout the world. But the important role they play in treating the sick and injured may be partially realized from the mere handful discussed in this article. In conclusion, I repeat that the development of rubber manufacturing has been almost as equal a boon to the modern hospital as has been the development of the hospitals themselves.

A-X-F—A New Plastic Material

A NEW plastic material, which has been named A-X-F plastic, which was described in detail by S. D. Shinkle, A. E. Brooks and G. H. Cady at the annual Fall meeting of the Rubber Division, A.C.S., held in Akron on September 30-October 1, is being offered for sale by the Naugatuck Chemical Company. The principal use of A-X-F, which was developed by the research and development divisions of U. S. Rubber Products, Inc., is in oil resistant products in conjunction with DuPrene, Thiokol or rubber. It is said to plasticize DuPrene and Thiokol and improve their processing qualities. It acts as an anti-scorch with DuPrene in storage and in processing.

A-X-F is said to increase the oil resistance more than inert fillers and at the same time retain the elasticity properties to a greater extent. According to Naugatuck Chemical it is a chemically inert, pure, hydrocarbon material, insoluble and non-swelling in practically all solvents. It can be handled and processed like rubber, but is not hardened by heat and sulphur. The specific gravity of the new plastic material is 1.097.

New Para-Dor Deodorants

FIVE new Para-Dor deodorants for use in rubber compounding have been introduced by Givaudan-Delawanna, Inc., New York City. This new series of rubber deodorants is said to effectively overcome the odor of rubber compounds without imparting an undesirable sweet odor, a former criticism of the company's products. The deodorants, which include a sharp odor, fruity type, lilac, sharp, and jasmine, were developed by Givaudan chemists as a result of suggestions received with regard to some of the deodorants previously in use. The most often recurring comment was that the bulk of the rubber deodorants were too sweet in character and were therefore considered inappropriate for many types of rubber compounds. The five new Para-Dors are said to effectively meet all past objections and also conform to requests that lower-priced rubber deodorants be made available.

Pearson Donates Rubber Library to Los Angeles Institution

Forty-Year Collection of Rubber Books, Magazines, Maps and Other Data Presented to the Public Library

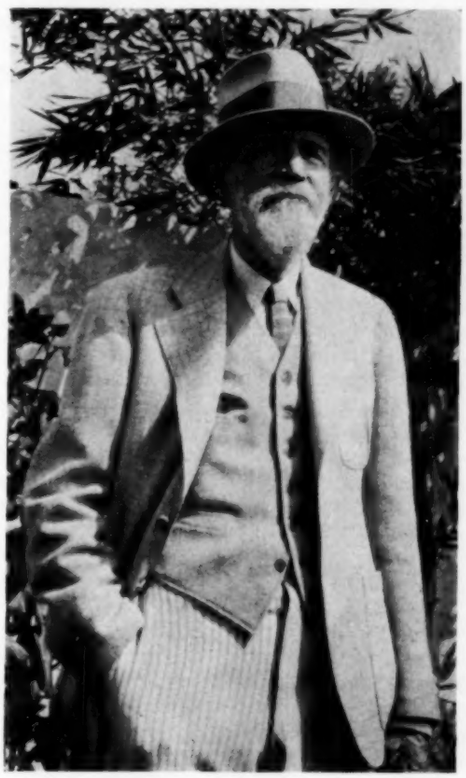
ONE of the rarest and most complete collections of rubber literature ever assembled has been donated to the Los Angeles Public Library by Henry C. Pearson, former publisher of the *India Rubber World*, who retired from active business several years ago. Believed to be unique in its comprehensive survey of the rubber industry, the collection, which represents a collation of material over a forty-year period, consists of some 700 volumes, and will be made available to research workers in the next few months as soon as preparation and indexing are completed by the librarians.

Donation of the Henry C. Pearson Rubber Library was made to Los Angeles rather than to New York or Chicago, according to Mr. Pearson in a letter to THE RUBBER AGE, because "it seemed to me that as a center of rubber interest on the coast it is better placed, particularly with the certainty of the future expansion of the industry out here."

In making the donation Mr. Pearson stated that "The trend of Empire sets Westward. The rubber business has moved from the East to the Middle West and is now strongly impinging on the West Coast. One-third of all manufactured goods in the Los Angeles area are rubber goods. The advantages of manufacture in Southern California are its nearness to the supply of basic materials and its ability to manufacture the year around. I believe the Pacific Coast to be the big manufacturing region of tomorrow, so far as rubber is concerned.

"My particular idea in giving this library to the Los Angeles Public Library is that it will be beautifully housed and catalogued. The volumes in that library mirror the progress of man. It contains a history of the leaders in the industry. The problems that faced the rubber development were the most intricate by which any industry was ever confronted—and they were solved with success. The record is all there for those who are here, and for those who will gather on the Pacific Coast in the future to carry the rubber industry still further . . . And I am the only one who can snatch any of the books out! The India Rubber Library is inviolate to borrowers except for myself!"

Included among the 700 volumes are books gathered over a period of 40 years, bound magazines, pamphlets and masses of clippings collected from all parts of the world



Henry C. Pearson
A recent photo taken at his Altadena summer home

where rubber is cultivated and used, written in French, Spanish, German, Portuguese and English. In the opinion of Anne F. Leidendeker, department head of Science and Industry of the Los Angeles Public Library, a complete history of the rubber plantation movement, the vulcanizing and commercializing processes, and the growth of the great rubber companies could be written from the source material contained in the collection.

For instance, in the English language, there is the book by Charles Goodyear, published in 1853, treating with the beginnings of vulcanization. There is a volume on British Rubber Patents published in 1859. There is a Report from Great Britain which appeared in 1861 on the construction of submarine telegraph cables. These are but a few of the volumes which date back to the middle of the last century.

Among other English books in the collection are the following, the dates of publication being indicated in each case: Who's Who in the Rubber World (1914); The Rubber Industry of the Amazon, by Joseph R. Woodroffe (1915); The Chemistry of Rubber Manufacture, based on Weber's Chemistry of India Rubber (1926); Some Modern Aspects of Rubber Cultivation, by Charles Herbert Wright (1928); and an English translation of The Science of Rubber, by Karl Memmler (1934). This latter book was translated by members of the Firestone research division.

Mr. Pearson's reputation as an author of books pertinent to the rubber industry is well known internationally. Naturally the six books he has written over a span of twenty-two years are among those in the collection. These include Crude Rubber and Compounding Ingredients (1899); What I saw in the Tropics (1906); Rubber Tires and All About Them (1906); Rubber Country of the Amazon (1911); Rubber Machinery (1920); and Pneumatic Tires (1921).

Volumes published in German include: Materialienkunde fur die Kautschuk-techniker, published in Dresden in 1906; Zoll handbuch fur die Gummibranche, edited by A. Gravell in 1910; and Die Kautschukwaren Industries Deutschlands by Wilhelm Vaas which appeared in 1921.

In French there are reports by La Condamine and another by Fresneau in volumes published many years ago by the French Royal Geographic Society. There is

also much valuable matter in Spanish and Portuguese including the publication Defesa do Borracha. Additional volumes are included on rubber exploration in Asia, Africa and South America in several languages.

In addition to the books there is a wide variety of bound periodicals which, in themselves, represent a fairly complete history of the development and commercialization of rubber. Publications of the United States include a complete file of the *India Rubber World* (dating back to 1889), a file of THE RUBBER AGE, and one of the *India Rubber Review*. There is even a bound volume of the first American rubber periodical, i.e., *The Vulcanite*, which was published for only one year, and *The Rubber Era*, which was published during the year of 1882. A complete file of *Tires* is included. Bound copies of such periodicals as the *Vulcanizer and Dealer, Tire and Motor*, and other short-lived publications allied with the rubber industry are also included in the collection.

In the complete files of British publications are included the *India Rubber Journal* and *The Rubber Age* (London), in addition to bound volumes of many other periodicals having to do with rubber planting among them being files of the *Bulletin of the Institution of the Rubber Industry, Bulletin of the Rubber Planters Association*, and *Greiner's Rubber News, The Rubber World, The Malayan Tin & Rubber Journal*, and others.

In German, there are complete files of *Gummi-Zeitung* supplemented by files of the *Gummi-Markt*, the *Deutsch Gummi Industrie, Kautschuk, Kuhnstoffe*, and others. In French, there is a complete file of *Le Caoutchouc et la Gutta Percha*.

Over and above all of the books and bound volumes of publications described there is a wealth of material in pamphlet, loose-leaf, article and miscellaneous form. This material includes data treating with German chemical, industrial and planting subjects; articles on rubber and guttapercha from Kew Gardens (England), as well as the British Botanical Gardens at Ceylon, Singapore and other centers; botanical reports from the Netherlands Indies, French Indo-China, the Belgian Congo, etc.; a collection of house organs and material reflecting the Mexican and Central American planting boom of many years ago; data, including colored maps, pertaining to Brazilian conditions in rubber over a score of years or more; and additional clippings of varied importance all pertinent to the rubber industry.

Mr. Pearson's Personal History

It can be readily understood that only an individual whose life interest was centered on the subject of rubber, and one who has traveled extensively to many corners of the earth, could possibly have collated and donated a rubber library such as above described. A word as to Mr. Pearson's personal history should prove of interest.

Henry C. Pearson was born on February 13, 1858, at LeRoy, Minnesota, the son of Charles Henry and Emily Catharine. He was educated at public schools, entering the business world in 1875, at the age of 17. His first job was with the Tyer Rubber Company, of Andover, Massachusetts, and he remained with that company until 1881. From 1881 to 1883 he was associated with the Hayward Rubber Company, of Bozrahville, Connecticut. In 1885 he married Adelaide Ella French, of Norway, Maine, and in the same year turned to general newspaper work for a livelihood. He was engaged in this work, also acting as a foreign correspondent, until 1889, in which year he founded the *India Rubber World*, editing that publication until his retirement several years ago.

As a rubber expert, Mr. Pearson acted as American representative at the Paris Exposition in 1900. He was also present at the St. Louis Exposition in 1904 in the same capacity. A keen student of his selected industry he traveled extensively the result of which was the writing of several books on rubber cultivation. In addition to his previously described books, he also was called upon to contribute special articles on rubber for the Encyclopaedia Britannica which appears in the 1922 and 1926 editions.

Socially active, Mr. Pearson is a Fellow of both the Royal and American Geographic Societies, as well as a member of both the American Chemical Society and the American Society for Testing Materials. His athletic prowess is disclosed in his memberships of the Los Angeles, Hollywood and Santa Monica Athletic Clubs. He is also a member of the Annandale Golf Club, and a Mason.

Of an inventive mind, he is credited with the invention and introduction of "shuffle ball," "cue ball bowls," and other lawn games. Today, at the age of 77, he is in excellent health and, among other things, is engaged in writing his memoirs, gathering a good deal of material from the library donated to Los Angeles. His permanent residence is in Palm Springs, California, but he maintains a summer home at Altadena, near Los Angeles. With reference to his donation to the Los Angeles Public Library, Mr. Pearson confesses that it represents a collection of forty years "with nothing thrown away."

Thiokol Coating Materials

A LINE of synthetic rubber coating materials has been introduced by the Thiokol Corporation, Yardville, New Jersey. Featured among the several materials is one designated as Thiokol C-103. This coating material can be brushed, sprayed, dipped or spread. It dries by evaporation, produces a tough film with an elastic limit in excess of 400%, and retains its flexibility to below —40°F. According to its manufacturer Thiokol C-103 bonds solidly to most surfaces and does not separate nor deteriorate with age, the resulting film being stable to actions of sunlight, oxygen, ozone and ultra-violet light, standing up well under natural aging. It also has a high gloss.

The new coating material is said to be impervious to permanent gases, the company claiming that it is over 20 times less permeable to hydrogen, helium and air than the best natural rubber compounds. It is also stated to be unaffected by all petroleum hydrocarbons as well as by most alcohols, ketones and esters. It is highly resistant to aromatic hydrocarbons and chlorinated solvents. Thiokol C-103 is claimed to be resistant to dilute solutions of acids and alkaline and oxidizing agents, and unaffected by carbonate solutions. It is not recommended to stand concentrated alkalis nor concentrated sulfuric or nitric acids.

Among applications for Thiokol C-103 the company suggests the following: for coating and impregnating cloth, cork, leather, vegetable and animal fibers in general; for coating of rubber to protect it against grease, oxidation, sun checking and solvents; as a binding agent in the manufacture of oil resisting packing and gaskets; and for coating of metal structures to combat the corrosion caused by organic and inorganic fumes. It is not specifically recommended as a general paint since it will not protect against corrosion under water.

In addition to this synthetic rubber coating material the Thiokol Corporation also manufactures C-1 Series Liquid Dispersions, each designed to meet a specific purpose. These vary in color from a very light amber to deep black and in viscosity from a very thin solution to heavy doughs. C-1 Series gives a film that has to be heated to 287°F. for 1¼ hours to get maximum toughness and strength. However, according to Thiokol, the solvent resistance is just as good before baking as after baking and for many uses baking is not necessary.

Pneumatic Tires—Design and Construction

By A. E. Benson

Product Development Department, The Fisk Rubber Corporation

SINCE the subject of pneumatic tires is too broad to discuss in a short time, it is obvious that many of its aspects must be omitted at this time, and therefore it is the chief purpose of this paper to center the discussion on the design and construction of the pneumatic tire.

In order to better appreciate the fundamental features of pneumatic tire design and construction, it will be well to begin by considering a few basic facts about pneumatic tires.

To the average motorist, the pneumatic tire on his automobile does not represent very much of an engineering problem. He is chiefly concerned and naturally so, with the service that his tire renders, and this service he measures in miles per dollar. He apparently thinks of a pneumatic tire as he does of a pair of shoes or anything else that is manufactured and placed in use. He does not know, because he has not stopped to think, that the tire manufacturer merely provides air-tight tubes with covers or casings which are designed to function as described below.

The tube is the chamber for the air, and necessarily must be absolutely air-tight. In itself it could not stand any internal pressure. The cover or envelope, or casing, is made to surround the tube to restrain its expansion and thus enable the user to get air into the tube under compression. The casing also protects the tube from punctures and cuts, and carries a wearing strip of rubber, called the tread, to withstand road abrasions.

It is the column of compressed air which completes a tire unit, which carries the load, which provides elasticity or resiliency, or yield, or recovery, and cushions the automobile. It is this air under pressure that gives rigidity to the tire, through which the power of the engine can be transmitted to the road, thus propelling the vehicle. Again may it be repeated that the manufacturer supplies all these parts to enable the user to ride on compressed air. This fact is practically forgotten.

The casing, or envelope, and tube are given credit sometimes for a mysterious ability of being capable in some way to carry the load, to cushion, and to transmit drive. But such is not the real case. Every time a tire is punctured, there is concrete evidence that the casing and tube can do nothing of the kind.

The envelope of a tire is subject to every variety of strain, namely—internal and external pressure, squeezing, lengthwise and crosswise push and pull, twisting, pounding, and last but not least, to all the centrifugal forces which tend to tear off the tread from the cotton-reinforced carcass of the casing, all of which constitute extremely severe punishment for an article made of rubber and cotton.

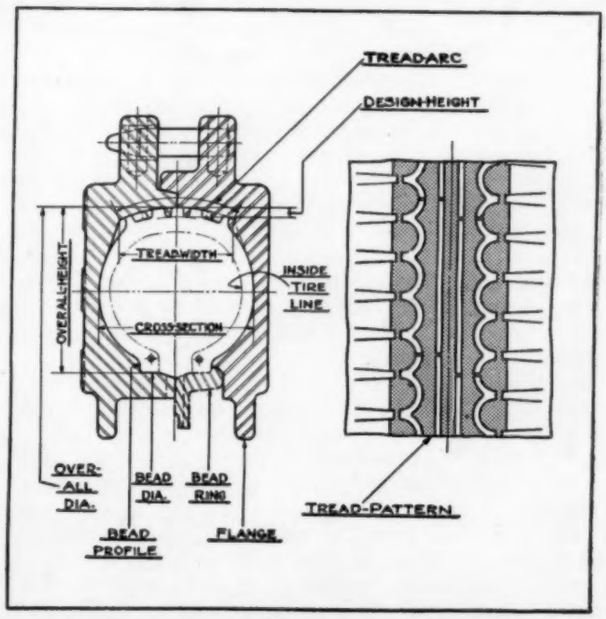
It is a beautiful piece of work. It has to be sufficiently strong and robust to protect the tube against all sorts of accidental damage. It has to be strong enough to resist damage to itself under all conditions outlined above, and it has to carry the tread, which takes all the wear of the contact with the road.

A tire used or operated under conditions different from those for which it was designed or intended will generally prove unsatisfactory. While modern tires are built to take a great deal of punishment, there is a limit to what the best of them can withstand. For example, a casing or tire, such as a balloon tire, designed to be used under a deflection, or drop, or depression of approximately 16%; will show early signs of failure when used under a deflection of 30 to 40%. The tire wall needs only to be over-flexed for a short time to cause a fracture or break. There is a maximum deflection for each size of tire of a given construction, beyond which the user cannot go without loss of tire life, or of the tire.

So it is evident that the use of a tire, the service of a tire, the mileage of a tire, or the life of a tire, depends entirely upon the user, how well he takes care of it, how well he keeps it inflated to that definite certain pressure that makes for him a complete and perfect pneumatic tire.

Everyone must understand that tires are as much a part of equipment as the engine of a car and that they should receive as close periodic inspection as will be given to any other part of the equipment.

The tire manufacturer is called upon to design and make tires which will be best suited to the various passenger cars, delivery cars, motor coaches and trucks introduced to the public by the car manufacturer. The car manufacturer fits the vehicle with rims and turns the unit over to the tire manufacturer for the proper tire, a tire which will give satisfactory service on that particular vehicle. Moreover, the car manufacturer assumes no responsibility for the tires on the vehicle. That responsibility is placed squarely on the tire manufacturer, as shown by reference



A layout, such as above, is the first step in designing a tire mold with consideration given to cross-sections and outside diameters.

This paper was delivered before the Rhode Island Rubber Club at East Providence, R. I., on September 19, 1935.

to any automobile descriptive booklet, in which it is always distinctly stated that complaints regarding tire equipment must be taken up with the tire manufacturer. It is apparent that it behooves the tire designer and manufacturer to study carefully the characteristics of the car, its weight, balance, speed, acceleration, brake equipment, wheel assembly, and any special peculiarities which might affect the tire assembly and service.

Fundamentals of Design and Construction

The curing process consists of placing the so-called raw tire into a mold and subjecting the same to heat and pressure. Since the average motorist is initially impressed with the outward appearance of the tire, it will be well to discuss tire molds first and give a general idea of their design and construction.

Although the mold plays the final part in tire construction, it is nevertheless of first importance because the tire structure is based on the size and shape of the mold. For this reason, it is important that the molds be designed accurately and be machined by experienced workmen to tolerances as close as those of a piece of machinery. In designing a tire mold, consideration must first be given to the inflated cross-section and outside diameter of the tire which is to be produced. The cavity is then made of a definite size with the necessary allowance for the angle of the cord in the fabric, the spread of beads from mold to rim and the expansion which takes place when the tire is inflated to a given air pressure on a standard rim.

The tread and bead that have been worked out separately are incorporated in the mold cavity and these are connected with sidewalls. The sidewalls consist of several radii all blending accurately with each other to give the tire a symmetrical outline. Around this cavity, there is built a steel box varying in thickness from ½" to 1", depending on the size, in order to withstand the enormous internal pressure in the vulcanizers. Heavy flanges are added to the outside and inside of the box to facilitate handling in production.

The perfect tire tread pattern or design should offer the greatest resistance to skidding, give the maximum traction and maximum tread design wear consistent with the life of the tire as a whole. It must be well balanced and rugged in appearance. The ideal tread must also be flexible to prevent cracking between the design members and avoid undue localized strains on the carcass and beads. Therefore, in the development of a tread pattern, it is necessary to establish the proper dimensional relationships between tread width and tread arc and to determine the correct spacing and arrangement of the design members which consist of bars, grooves and blocks. The width of the grooves, circumferential as well as cross-sectional, should be such to permit tread movement, yet prevent cracking due to flexing. The spacing and general arrangement of tread design blocks must take into consideration tread wear and balanced appearance, and avoid the possibility of a vacuum being created between them, thus causing whistling and rumbling noises when the tire is revolving at high speed.

Another factor involved in the determination of the design pattern is the depth, or height. This factor is chiefly governed by the design volume or the quantity of tread stock that it is necessary to provide in order that the tire will deliver the required mileage before becoming smooth.

Before disposing of the subject of the tread pattern, mention might be made that the weather man has more effect on tread wear than anything a tire engineer can do. Briefly, a tread will deliver at least three to four times more mileage in winter than in the summer months. This outstanding difference in tread wear is simply due to the fact that with an increase in temperature, the rubber becomes softer and, therefore, less resistant to abrasion.

After we have worked out on paper a suitable tread pattern, a full size wooden model of the tire is usually made and submitted to the Sales Department for approval. When this approval is obtained, a sketch of the proposed design is submitted to the Patent Department for their approval from a patent angle, as all tread patterns seen on new tires today are patented to give the necessary commercial protection. Often the model has to be modified due to possible interference with tread patterns used by competition. Having the Patent Department's approval of the tread pattern, the completion of the layout of the tire mold proceeds.

Having disposed of the tread pattern and cross-sectional dimensions of the mold, attention is turned to the design of the bead profile. This part is a very important part of the tire because proper anchorage of tire to the rim depends on the bead. It is, therefore, necessary to design the bead contour so that it will fit the specified rim properly to avoid rocking or creeping. When a tire is to be used on two rims having different flange heights, the bead is designed to fit both. This completes the mold cavity layout.

The completed drawing is turned over to the Machine Shop. Here a series of templates, gauges, cams and forming tools are made up before machine work is started. The templates and gauges are used in checking the work through the various machining operations because, as previously stated, the mold must be machined to very close tolerances.

It is the usual practice to make up a sample mold and build several sets of test tires to satisfy all of those concerned that the new tire will meet the requirements for which it was designed. A careful examination of the tested tires is made and often it is necessary to make slight changes to improve the service. Having disposed of the mold design, attention will now be turned to the construction of the tire itself. The manner in which the raw materials shall be distributed or worked into tire form is called the "construction" of the tire.

The compound chemists, fabric engineers and steel engineers are able to tell the construction engineers the strengths and other physical properties of the various materials to be used in the tire. With this knowledge, it is possible to determine the required amount and distribution of each particular material so that the tire will give the service demanded of it, or to obtain the maximum inherent value of materials used. The construction must be such as to produce a perfect balance between the various parts of the tire.

Steps in the Construction Layout

A tire is fabricated from many comparatively small parts which are carefully tailored into a finished unit. In order to evolve such a finished unit, a construction layout is made of each tire. A construction layout is an exact drawing of the cross-section of the tire made to two or four times actual size; illustrated is a view of the end section cut radially through the tire. These drawings are made very accurately, so that the amount of material may be accurately determined. The layout is to the tire engineer what blueprints and plans are to any other engineer.

In the layout work, well defined formulae are necessary for accuracy and uniformity in the tire line. Extensive research has been conducted in determining each step of the layout. When a new size and style tire is being added to the line, the construction development is carried on in the following manner:

First, the particular grade tire and its relative position in the line is noted, and from test car results, it is determined just what type of construction will adequately

meet the service required for this new size and style tire.

Next, by referring to layout and test tire data, the required distribution of the fabric and gum stock which will be necessary for this particular tire can readily be determined.

In order to properly distribute the stock, the component parts of the tire are studied in respect to each other, taking into consideration the mold features, the kind of fabric and quality of gum stock that is to be used. Each component part of the tire will be considered to show how the distribution of the stock is determined, and how each part functions.

Component Parts of the Tire

Fabric Plies. In the construction of the tire body, the cord fabric that is used furnishes the strength to resist bruising caused by severe shocks and sudden blows. Cord fabric also permits flexibility, which makes easy riding and prevents flex breaks. Finally, the cord fabric furnishes sufficient strength to the tire to enable the internal air pressure to carry the load.

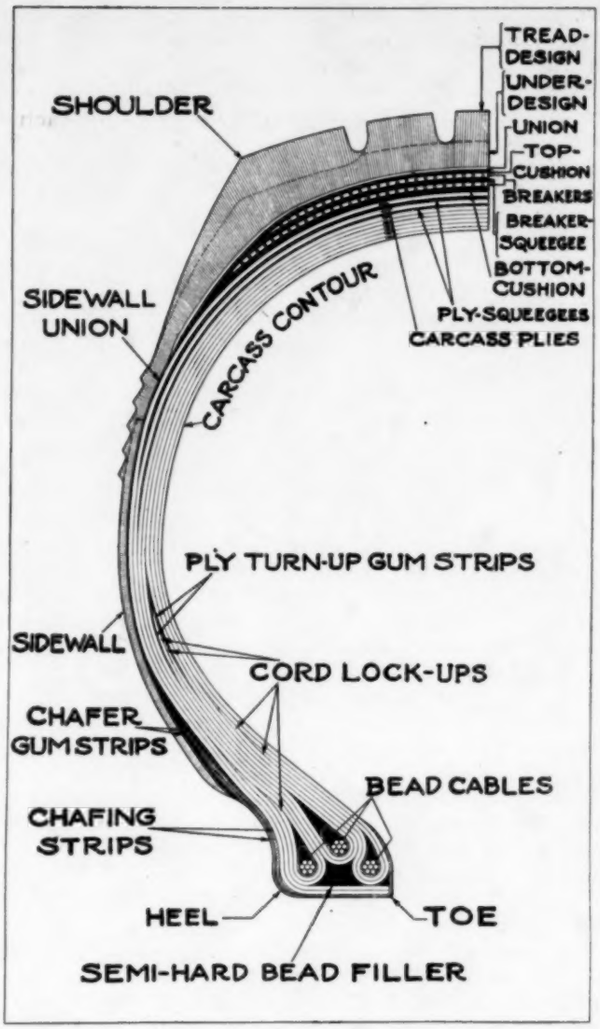
The cord fabric consists of stout cords of selected long staple cotton. The cords are laid side by side, under equal tension, so that each shall carry its share of the load. The cords are imbedded in gum rubber, which thoroughly impregnates and surrounds each cord. As the tire flexes in service, this rubber cushion permits free movement of cords and prevents chafing.

In the construction of the tire body, a ply of cord fabric is so placed that the cords are parallel with each other and cross the crown of the tire at a definite angle. This ply is then covered with another ply in which the parallel cords cross the crown of the tire at the same angle in the other direction. The angle varies slightly with different manufacturers. The number of plies used depends on the size of tire and the service to be demanded. Generally, the number of plies used run in multiples of two, that is—two, four, six, and up to sixteen plies.

Carcass Squeegees. Carcass squeegees or thin live rubber strips are used in such tires where tests have shown that extra cushioning is needed between the plies under the tread portion of the tire. These strips of live rubber add to the flexibility to make easy riding and prevent flex breaks and separation between rubber and cord fabric.

Bead Tie-in. The bead tie-in is the method of obtaining reinforcement above the bead of the tire. A tire must have sufficient support above the bead to prevent rim jams or bruises, to reduce side roll and to cushion all road shocks. This part of the tire must be flexible enough to prevent breaking out above the beads, to avoid separation, and to enable the tires to function as a unit and to prevent localized absorption of strains.

The common practice of obtaining ample reinforcement above the bead is to insert strips of square woven fabric, commonly called "flippers" or "suspensions." However, there are a number of tire engineers who believe in using cord lockups to obtain the required degree of reinforcement. When square woven fabric is used, the tire becomes much less flexible at the edge of these strips due to the marked difference in stiffness between cord fabric and square woven fabric. In the proper design of the bead tie-in, the area above the bead must become gradually more flexible and must have no abrupt changes in its degree of rigidity. By adding cord lockups, advantage is taken of using exactly the same material as used in the cord fabric of the tire carcass to obtain the required additional support above the bead and at the same time maintain the necessary flexibility; in fact, the cord lockups are simply a continuation of the cords constituting the tire carcass, and are obtained by cutting longer lengths of cord than is done in ordinary practice, and turning the extra length up around the bead.



Construction layouts, similar to the above, representing an exact drawing of the cross-section of the tire to be built, are essential.

This so-called lockup of the plies around the bead cables produces an anchorage for the bead cable similar to that used for anchoring the cables of a suspension bridge in the anchor points at each shore. Obviously, the cord lockups being a continuation of the tire carcass, the combined unit will function in unison in resisting strains, whereas when a square woven suspension strip is used, the cord fabric constituting the carcass plies being elastic and having a tendency to stretch more and pull away at the point where they are united with the square woven fabric, will eventually cause a separation at this point, and in many instances result in early failure of the tire in service unless the edges of the square woven fabric are heavily insulated from the cord fabric by means of live gum strips.

Additional rigidity for the bead is obtained through the use of so-called "Chafing Strips", whose main function is to prevent bead chafing as the name implies. The chafing strip is in all instances made of square woven fabric, which is very resistant to chafing. This use of square woven fabric has the least detrimental effect on the carcass plies, and yet serves its purpose of being absolutely free from the the carcass on one side, and thoroughly insulated from the carcass on the other side by means of gum strips.

The Bead Cable. The function of the bead cable is to hold the tire firmly and rigidly upon the rim. The type of bead in respect to the number of cables and strands of

wire per cable is determined by the grade of tire and type of service expected, backed up by a formula that assures the necessary factor of safety to withstand the most severe service. The beads of the tire must have sufficient strength to prevent the breaking of wires and to obtain the desired anchorage.

Sidewall Union. The question of using a sidewall union stock is decided according to the expected service to which the tire is to be subjected. Its function is to form a strong bond between relatively stiff, tough sidewall stock and the carcass. The service of tires is greatly improved by this stock, in that the carcass is better protected from bruises, and the sidewall stock resists gouging and scuffing to a greater degree. This stock is generally used in large truck and bus tires.

The Bottom Cushion. The bottom cushion is a layer of special compound stock that is placed over the carcass and under the breaker. Its function, as its name implies, is to cushion the carcass from bruises and shocks by absorbing and distributing the forces that are transmitted to it.

The Breaker. The breakers are generally made up of strong fabric, either open weave or cord. The breaker functions as a reinforced cushion. It absorbs the shocks and distributes them so that the bottom cushion is better able to absorb the balance of the shock. In the truck and bus tires, two breakers are generally used to give extra shock protection from the expected severe service.

Breaker Squeegee and Top Cushion. Breaker squeegee strips are generally placed between the breakers when two breakers are used. A top cushion is used in this type of tire as well as a tread union strip. The three component parts, together with the two breakers and bottom cushion, make up the complete cushion unit, which steps down the action caused by flexing and shocks, so that the strains are relieved between the relatively flexible tread and the relatively rigid carcass unit.

The Tread. The tread under-design functions to support the non-skid feature of the design members in the tread pattern. It must be thick enough to furnish the necessary design support, but at the same time be flexible enough to work freely with the tire and yet not crack.

The Sidewall. The function of the sidewall is twofold. It protects the carcass from moisture and from cuts and scuffing. The wall stock should be thick enough to give these protections, but yet must be thin enough to render more flexibility to the tire.

This completes in a very general way the discussion of the component parts of the tire.

Why are the "constructions" changed from time to time? The answer to this question is that service conditions are constantly undergoing changes due to higher powered cars, greater speeds, quicker starting and stopping, and these demand tires that are of proven value before they can be expected to give service.

In order to anticipate these conditions and keep the product out in front, it is necessary that the tire construction engineers constantly: (1) study existing constructions and their relation to ever changing service conditions, (2) keep in touch with the returned tires—to note any signs of weakness in the construction and to determine corrective measures, (3) keep up to date in regard to the trend of tire service and how competition is meeting these problems, (4) develop constructions for addition to the line of product, (5) study methods and determine formulae that will make for standardization, and (6) check the quality of the product which is being made to see that specification details are being met.

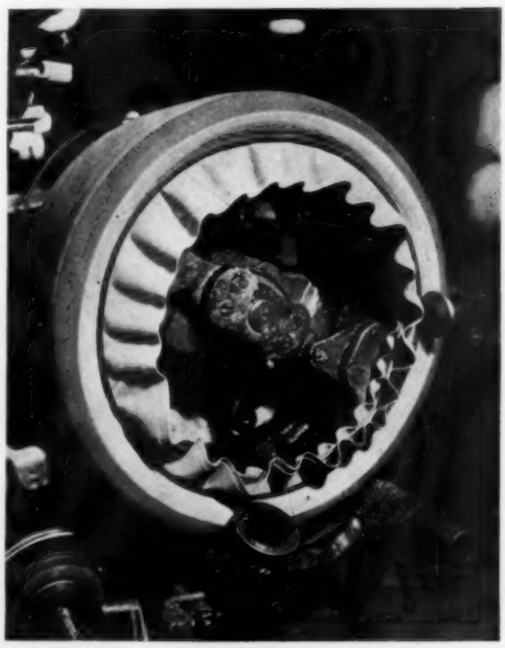
Before concluding this paper, it might be well to briefly mention a few outstanding tire developments of recent years. The two outstanding developments are the low pressure balloon and the pneumatic truck and bus tires.

In 1931, the 7.50/15 and 9.00/13 super low pressure tires were introduced to the public as change-over tire equipment for Ford and Chevrolet cars. Pressure of 8 to 12 pounds in rear tires and 15 to 20 pounds in front tires were recommended as proper pressures, the higher pressure in the front tires to assist in getting smoother operation of the car and better steering conditions. For these tires, it was claimed that the cushioning effect far surpassed all previous assemblies. Due to the large effective contact area, a person could drive the car on these tires over rough roads or through fields in which cars otherwise equipped could not follow. Many cars were changed over to these super low pressure tires.

However, it soon became evident that the car engineer had not designed the automobile to use these tires. First, it was soon proved that the steering geometry was not satisfactory, as evidenced by the instability of the front end, and shimmy at high speeds. Second, due to the radical increase in deflection and the resultant large area of tread to road contact, a noisy tire, and above all, fast and erratic tread wear, or low service mileage, became objectionable. Therefore, it is obvious that during this experimental period, these tires were not readily accepted by the consumer in spite of the apparent advantages to be obtained from the extra cushioning properties. In short, the car manufacturer was not prepared to use these tires.

But progress was not to be denied, because the car engineers eventually became more tire-minded and active, and designed cars that could be safely equipped with a modified and compromised form of a low pressure tire. Instead of using 7.50/15 and 9.00/13 tires, the 5.25/17 and 5.50/17 sizes were specified and proved to be satisfactory from all angles. The trend toward the use of tires having larger cross-sections and smaller rim diameters became more gradual, and as more experience was gained by the car engineers, a more orderly development program became possible. Soon the car manufacturers were able to use low pressure tires having a 16″ rim diameter and cross-section of 6.00″, 6.25″, 7.00″ and 7.50″. The majority of cars produced in 1935 are equipped with 16″ tires, the 6.00/16 being the most popular size.

The trend continues, as there are indications that sev-

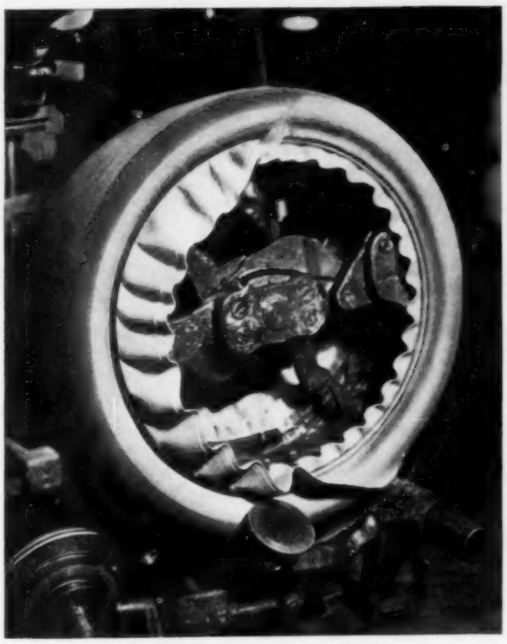


This tire, being built on a semi-flat drum, is having its bead cable set in position by the bead setter on the right.

eral of the 1936 cars will be equipped with tires having a 15″ rim diameter and 6.50″, 7.00″ and 7.50″ cross-sections.

The second outstanding development of recent years is the pneumatic truck and bus tire.

The pneumatic truck and bus tire obviously was designed to replace the solid rubber tire. There were certain fixed limitations of service that could be demanded of solid tires. In the first place, solid tires were not designed for high speeds; in fact, it was necessary to produce three types of solid tires—namely, one type to withstand heavy loads at low speeds, not exceeding 15 miles per hour; one type for medium speeds, not exceeding 25 miles per hour; and finally, one type for lighter loads and speeds not exceeding 35 miles. Above 35 miles per hour, the solid tire life decreased so rapidly to make it impractical. Therefore, there were two specific reasons for the need of pneumatic truck tires; first, to obtain a tire to withstand service at high speeds, and second to withstand service under heavy loads. Mention might well be made here that there also was a need for tires that would not ruin the road bed, as was characteristic of solid rubber



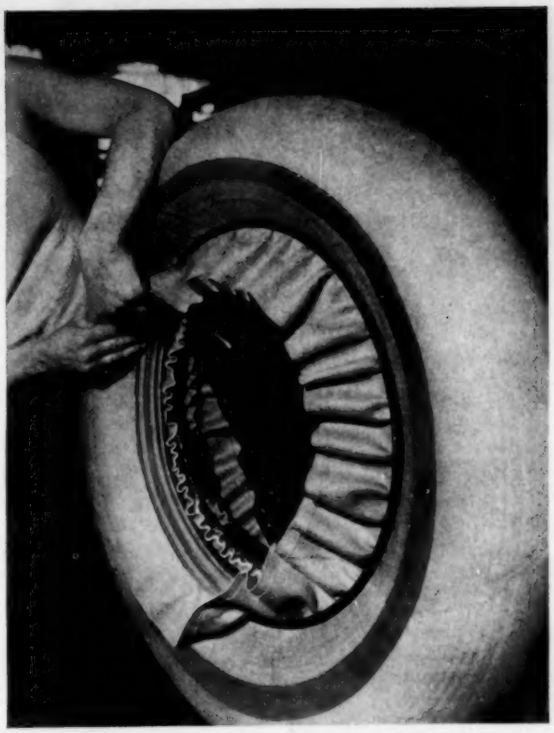
In this view the cable bead is being securely and permanently locked into the cord carcass of a passenger tire.

tires. Obviously, the tire engineer was faced with a problem of tire design of the greatest magnitude.

The first pneumatic truck and bus tires produced were subjected to very severe service conditions, and consequently tire failures at low mileage were very common. In fact, it was considered a miracle to have a truck tire give as much as 5,000 miles of service. The tire engineer was faced with the prevailing habits of overloading and under-inflation. Briefly, abuse and neglect caused much the largest percentage of truck tire failures.

Through mutual cooperation between the tire manufacturers and users, the operators of bus lines and other users of truck and bus tires generally have come to the realization that by the proper use and care of tires, there would be a beneficial effect of a very noticeable increase in tire mileage and operating profits.

Furthermore, in consequence of this type of cooperation and as the result of the tire manufacturer having made



Here one of the bead cables has been partially encased in the cord fabric which is being folded back onto the tire.

amazing improvements in the construction, design, compounds and methods of manufacture, the average mileage for this type of tire has been considerably increased in the last ten years, for it is not uncommon to hear claims of obtaining 100,000 miles of service from a tire. Large fleets of buses using thousands of tires annually report average mileage figures of 40,000 to 60,000 miles per tire.

The trend toward the use of pneumatic tires on trucks and motor coaches continues onward. High pressure truck tires as large as 10″ in cross-section and 24″ in rim diameters, and low pressure bus tires having 13.50″ cross-section and 24″ rim diameters, both having sixteen plies of fabric, are being commonly produced. For open pit excavation work, huge trailers are known to be equipped with pneumatic tires having an 18″ cross-section. So it is apparent that there is no end to the service demands for which the tire engineer might be requested to develop a suitable tire.

In conclusion, it is desired to impress upon you that altogether, through continued research work, the following up of this work in actual road test, as well as laboratory test, puts the product in a position today where every condition of control is used, and indicates that tire manufacturing is gradually approaching lines of industry where construction balance and specifications are determined accurately before work is started, and where factors involved in drawing up these specifications are based on known and mathematically correct formulae and standards instead of guess work and costly experience.

Although the efforts of the tire engineer, chemist, and physicist have resulted in a vastly improved tire, much still remains to be done. Research and development are constantly in progress in the laboratories of the rubber tire industry for the principal purpose of increasing our knowledge regarding tire construction and compounding of the rubber. It is firmly expected that the future will bring results far greater than those obtained in the past few years.

The Rubber Division, A. C. S., Holds Annual Fall Meeting

Ten Technical Papers Presented at Two-Day Session in Akron Which Features Election of Officers and Crude Rubber Report

THE annual Fall meeting of the Rubber Division, A.C.S., was held on September 30 and October 1 at the Mayflower Hotel in Akron, Ohio, with a registered attendance of 416. In addition to ten technical papers, the two-day session was featured by the first report of the Crude Rubber Committee, which was appointed at the Spring meeting, and the election of officers, plus the usual gala banquet.

Although the general custom in the Rubber Division is to elevate the vice-chairman to the chairmanship, a deviation from this unwritten rule occurred at Akron when H. E. Simmons, president of Akron University, declined with thanks the opportunity of serving in that capacity due to pressure of business at the University. At the ensuing election Norman A. Shepard, technical director of Firestone, was elected to the post of chairman. H. L. Trumbull, of the chemical research division of Goodrich was elected vice-chairman, while C. W. Christensen, of Rubber Service Laboratories, and L. W. Brock, of C. P. Hall, were re-elected to the posts of secretary-treasurer and sergeant-at-arms, respectively.

Members named to serve on the executive committee for 1935-6 included Dr. A. A. Somerville (Vanderbilt), O. M. Hayden (DuPont), A. R. Kemp (Bell Telephone Laboratories), W. W. Vogt (Goodyear), and S. M. Cadwell (U. S. Rubber), the retiring chairman of the Division.

On Monday afternoon, following registration, the first session took place in the ballroom of the Mayflower, with six papers being presented, these being, in the order of their presentation, as follows: AXF—A New Plastic Material, by S. D. Shinkle, A. E. Brooks and G. H. Cady; Oxygen Absorbers and Their Effect in Rubber, by A. A. Somerville; Effect of Different Temperatures and Oxygen Pressures on Rate of Aging of Soft Vulcanized Rubber, by J. H. Ingmanson and A. R. Kemp; Notes on the Determination of Sulphur in Rubber Compounding, by C. Herbert Lindsley; and A Rapid and Practical Method for the Determination of Free Sulphur in Rubber, by E. W. Oldham, L. M. Baker, and M. W. Craytor.

Starting at 9:00 A.M. the following morning four additional papers were given in the following order: An Impact Cutting Test for Tire Tread Stocks, by J. H. Dillon; The Determination of Guanidines in Rubber Stocks and the Consumption of Guanidines During Cure, by Bingham J. Humphrey; Diffusion of Water Through Rubber, Synthetic Resin, and Other High Polymeric Materials, by R. L. Taylor, D. B. Hermann and A. R. Kemp; and the Raman Spectra of Rubber and Some Related Hydrocarbons, by S. D. Gehman and H. J. Osterhof. Abstracts of the papers appeared in the September, 1935, issue of THE RUBBER AGE.

As usual, discussions were held after the presentation of each paper with a lively session reported after each address. Following the delivery of the last paper on Tuesday morning, the Crude Rubber Committee rendered its report which is given in full at the end of this article. The Secretary-Treasurer then rendered his annual report. After this report, the election of officers was held. At the conclusion of the elections a rising vote of thanks was given to the outgoing officers and to Dr. H. E. Simmons for the many years he has served as an officer of the Division.

Left: Norman A. Shepard, newly-elected chairman of the Rubber Division. Right: H. L. Trumbull, selected as vice-chairman for the 1935-1936 period.

On Monday night, September 30, the banquet was held, also in the Mayflower's ballroom. In addition to the usual excellent dinner a variety of entertainment was presented featuring vaudeville acts of sundry talent ranging from dancing to singing. The music was under the direction of Walter Logan. Approximately 500 persons attended the dinner.

Souvenirs and prizes distributed at the banquet, which included a number of interesting novelties, were donated by the following companies: E. I. du Pont de Nemours & Co.; R. T. Vanderbilt Co.; Dow Chemical Co.; New Jersey Zinc Co.; Wishnick-Tumpeer, Inc.; General Atlas Carbon Co.; THE RUBBER AGE; Godfrey L. Cabot; V. L. Smithers Co.; Columbia Alkali Corp.; American Cyanamid & Chemical Corp.; Binney & Smith Co.; Rubber Service Laboratories; Ohio Boxboard Co.; Henry L. Scott Co.; Akron Chemical Co.; Anaconda Zinc Oxide Co.; Muehlstein & Co.; United Carbon Co.; C. P. Hall Co.; American Zinc Sales Co.; F. F. Myers Co.; and the Superior Zinc Company.

Another feature of the Fall meeting was the arrangement of trips to several factories in Akron. Held on

Tuesday afternoon, October 1, these included trips to the Anaconda Zinc Oxide Company, the tire manufacturing plants of Firestone and Goodyear, and the mechanical processing division of Goodrich. These trips were well attended by visiting chemists. Arrangements were also made to permit members and guests of the Rubber Division to play golf at the Fairlawn Heights Golf Club on payment of usual green fees.

Members of the various committees directing activities at the two-day session included the following: General Committee on Local Arrangements—A. A. Brill, G. L. Allison, A. W. Carpenter, and H. I. Cramer; Registration —G. L. Allison, W. W. Vogt, C. B. Moore and H. F. Palmer; Banquet—V. L. Smithers, Enos Baker, H. P. Protheroe, B. S. Taylor and J. N. Street; Trips and Transportation—E. C. Zimmerman, C. W. Sanderson, Grant Duncan and A. B. Merrill; Publicity—C. P. Hall, N. A. Shepard, L. B. Schrell, H. L. Trumbull and E. H. Nahm. In addition to these committees the Ladies Entertainment Committee consisted of Mrs. R. P. Dinsmore, Mrs. N. A. Shepard, Mrs. E. Blaker, Mrs. J .P. Maider, Mrs. H. A. Hoffman, and Mrs. G. L. Allison.

REPORT OF THE CRUDE RUBBER COMMITTEE

Two papers on crude rubber were presented to the Rubber Division of the American Chemical Society in New York City on April 23, 1935. The first of these papers by Mr. G. A. Sackett of Goodyear presented the subject from the consumer's point of view, showing what characteristics in rubber were desired. The second paper was given by Dr. Edgar Rhodes of the Rubber Research Institute of Malaya, and covered the subject from the producer's angle.

Following a lengthy discussion from the floor, Dr. Cadwell, Chairman of the Rubber Division, in a brief summary of the subject, stated that it was evident that there was a lack of understanding on the part of the producers as to what the consumers wanted or needed, and on the part of the consumers as to what the producers could furnish. The chairman then appointed a committee to be known as the Crude Rubber Committee and stated that the function of this committee was to promote better understanding between the producer and consumer.

The personnel of the Crude Rubber Committee is as follows: E. B. Babcock, (Firestone), W. A. Gibbons, (U. S.), Harold Gray —Chairman, (Goodrich), G. A. Sackett, (Goodyear), and J. A. Walton, (Boston Woven Hose).

The committee held a preliminary meeting in New York City on April 23, at which time it was agreed to hold a second meeting in Akron, Ohio, on April 27. The New York meeting was attended by several other members of the Rubber Division. The suggestions of these men were gratefully received. Dr. Rhodes attended the Akron meeting and the committee obtained some very helpful suggestions from him on the general situation in the Far East.

The first action of the committee at Akron was to define the scope of the committee's operations. The following outline was approved by the committee and released to the press through Mr. Christensen.

> "The function of this committee is to promote better understanding between the producers and consumers of crude rubber and to act as a clearing house between the two groups for information on the quality requirements for various crude rubbers, including latex; to exchange opinions on the value of new types of crude rubber, etc.
>
> "The committee proposed to establish contacts with the various technical agencies allied with the producers on the matter of quality requirements, methods of testing, and evaluation of new types of rubber, including latex.
>
> "The committee will concern itself only with technical aspects of the problem. The committee will deal only with those items, the information on which can be made public."

Having defined its limitations, the next general item taken up by the committee was to establish points of contact with the producers' organizations. A series of letters was accordingly sent out to various associations having to do with the production of rubber. These organizations are as follows: Director of the West Java Proefstation, Buitenzorg, Java, N.E.I.; Director of A.V.R.-O.S. Proefstation, Medan, E. C., Sumatra, N.E.I.; Director, Ceylon Rubber Research Scheme, Culloden, Neboda, Ceylon; London Advisory Committee for Rubber Research, Imperial Institute, South Kensington, London S.W.7; Director, Rubber Research Inst. of Malaya, Kuala Lumpur, F.M.S.; A. L. Viles, Rubber Mnfrs. Ass'n, 444 Madison Ave., N. Y. C.; Rubber Growers Ass'n, 19, Fenchurch, London E.C. 3; and Dr. A. Van Rossem, Director, Netherlands Government Rubber Inst., Delft, Holland.

Owing to the great distances involved, and due to the absence of several of the directors during the summer months, it has taken considerable time to receive replies from these organizations. Some of the groups do not have official meetings during the summer months and were necessarily delayed in answering our communications. Answers have been received from most of the above organizations. All of the groups who have answered have expressed their willingness to cooperate in every possible way. It goes without saying that the Crude Rubber Committee would have been very much handicapped without the cooperation of the organizations mentioned above, and their expression of whole-hearted cooperation has been very gratefully received.

The third general problem discussed by the committee was the possibility of establishing definite test recipes and procedure for evaluating crude rubber. Various test recipes used by the laboratories of the men on the committee were obtained and sent to all of the members. Discussions have been held and recommendations have been received from various men in the industry not on the committee.

The foregoing is a summary of the work carried on by the committee prior to the meeting in Akron on September 29, 1935.

The third meeting of the committee was held in Akron on September 29. The meeting was attended by all members of the committee and by Dr. Cadwell. The first action taken was to re-affirm previous statements to the effect that the committee will concern itself only with technical matters, the information on which can be made public. The committee does not propose to concern itself with any legal questions.

Practically the entire time of the meeting was taken up with a discussion of various test recipes for crude rubber and with the results obtained from them in the laboratories of the committee members.

Eleven recipes that are used by various companies for checking crude rubber quality were investigated along with a series of variations of these recipes. The committee finally agreed upon one recipe very similar to that used by the London Advisory Committee as offering most promise. The committee, however, is not as yet ready to officially recommend this recipe for general use. It is proposed to spend an additional three months' time in testing on this one recipe and then have a meeting and correlate all of the data obtained during this period. It is hoped that the three months' period will be sufficient to permit our definitely deciding upon this one recipe. If not, we will have an additional three months' period before the next meeting of the Rubber Division in the Spring.

During this next three months' period, we propose to confine our efforts primarily to No. 1 Ribbed Smoked Sheets.

To date, the committee has concerned itself primarily with the rate of cure of rubber. There is some evidence to the effect that plasticity may vary with the rate of cure. We propose to check this item as much as possible during the next three months' period as we do not have sufficient information at hand to make a positive statement at this time.

The committee further feels that if rubber can be standardized as far as rate of cure is concerned, the variation in aging will be minimized.

The committee will appreciate offers of assistance from other laboratories as considerable effort is necessary in a testing program of this kind.

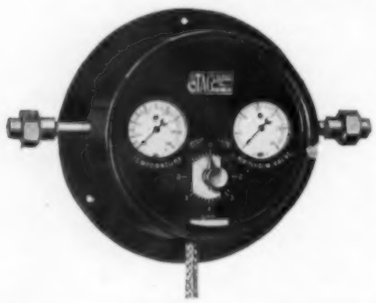
The committee further wishes to express its appreciation to the men in the industry who have written in suggestions and it is needless to say that we would appreciate hearing from any of you who may care to comment upon the program.

HAROLD GRAY,
FOR THE COMMITTEE

New Equipment

Tag Number 40 Controller

SUITED to the majority of automatic control applications, the Tag Number 40 Controller has been introduced by the C. J. Tagliabue Mfg. Company, Brooklyn, N. Y. Although the principle of control is basically the Tag movement, the new controller has been redesigned for compactness in such fashion that the few simple parts are accessible with ease. Tube systems can be interchanged



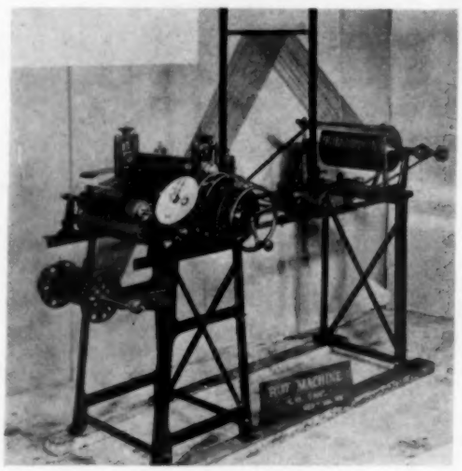
with facility. A novel spring lever, designed to eliminate lost motion, multiplies the movement of the capsular spring for sensitive yet positive control. The smallest change in temperature is transmitted positively to the ball air valve which in turn resets the rate-of-flow through the diaphragm actuated control valve.

New Adamson Press

THE first of a new line of plate side platen presses has just been completed by Adamson Machine Company, Akron, Ohio and shipped to a Western molded goods plant. Several new features are incorporated in this press. Although it is of the mold ejector type, no new molds are required as the platens are arranged to hold the usual style molds. The top and bottom halves of each mold are ejected automatically when the press is opened with the upper section resting at an angle of 30° off vertical thus allowing easy accessibility for cleaning or other purposes. Due to the special design, there is no limit to the amount of hydraulic pressure which can be put on this press. It has a 26-inch ram at 2000 pounds pressure. It is equipped with breaking cylinders to break the molds. The present model has 32 x 32 inch platens but according to the manufacturer it will be available in various sizes.

Ruf Rubber Slitting Machine

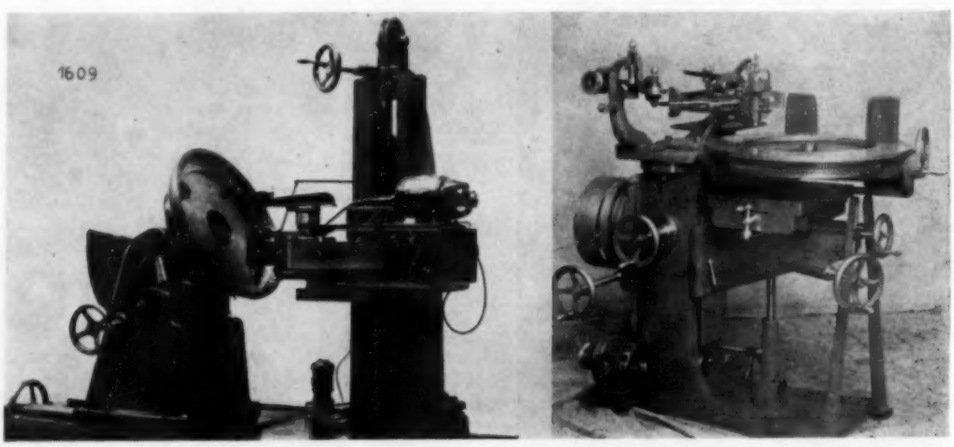
SLITTING machines for use in the rubber industry are being featured by the Ruf Machine Company, Inc., 417 East 93rd Street, New York City. One model, a



narrow width machine with re-wind attachment, illustrated herewith, will slit rubber sheets into widths from 1/32" upwards. A double row of circular cutters are used, the edges of which overlap each other, thus giving a shearing effect. A multiple spooler is used for winding up the narrow width strips on bobbins after they are cut. In addition to slitting rubber, these machines are also adaptable to slitting transparent cellulose, paper, cork, aluminum and other materials in narrow widths.

Marquette Universal Pantograph Machines

A LINE of die-sinking machines suitable for die-cutting and engraving of molds for rubber molding, as well as for plastic molding and die-casting, under the tradename of Universal Pantograph Machines, has been introduced by the Marquette Mechanical Engineering Company, of Erie, Penna. Several of the pantograph models, which are in the third dimensional arrangement, have been especially designed for use in the rubber industry, including the two illustrated below, these models being equipped for electrical control. All of these models are photoelectric cell controlled and reproduce from a template or master which can be reproduced to size or can be reduced. By means of a special arrangement the machines copy

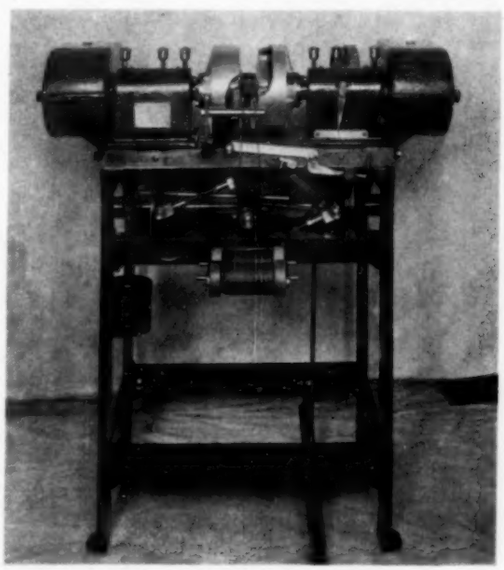


The first of the two machines on the right is the Marquette H-1 Tire Mold Profiler for engraving tire molds; the second is the H-3 Model which is adaptable for general rubber mold work. Both machines copy direct from blueprints and are automatically controlled.

direct from blueprints in a ratio of 1-1, reductions from 1-1 to 6-1 also being obtainable. Straight-shank cutters are used, the cutter capacity being from ⅛ to ⅜ inches. It is also possible to use taper-shank cutters. The machine tables have a 28″ x 12″ working surface with a 16½″ carriage length. The rotary tables have a working surface of 15″ diameter. By means of special construction of the tracer and its mechanism it is possible to use patterns or models of soft material, such as plaster, wax, wood, etc., there being little pressure on the tracer. All motions of the tracer may be automatically controlled when desirable, although semi-automatic and hand control is also possible. The drive of the milling-spindle is by variable speed-motors thus eliminating gears. The tracer-pin is interchangeable to fit the work and the cutter. Limit switches are provided to control the various desired movements.

Corona Golf Ball Winding Machine

OPERATING at a speed of 900 R.P.M. on approximately ⅛ H.P., an improved model golf ball winding machine has been introduced by the Corona Manufacturing Company, Mount Airy, Philadelphia, Pennsylvania. The new model winds two threads simultaneously and restarts



Cores may be wound to any desired density on this Corona golf ball winding machine just introduced.

broken threads without stopping. Any type of center can be wound with very fine thread or thread up to ⅜th inch wide, an even distribution being automatically maintained with no tendencies toward pole to pole windings. It is said to be impossible to pull a core out of the machine by increasing the tension. Cores may be wound to any desired density. A mattress effect, to which the cover can be securely anchored, is secured by means of the two threads laying side by side, when wound, thus forming a star pattern. Operation is said to be simple. The center is placed in the machine; with power turned on full speed, the end of the threads are dropped on to the revolving center; the threads start winding evenly around the center forming a cylindrical ball; if the threads break the operator again drops the ends on the revolving core where they immediately attach with even winding continuing. Requiring only one adjustment, the Corona machine is equipped with automatic size stop and ball bearing yokes.

Book Reviews

MODERN LABORATORY APPLIANCES. Published by the Fisher Scientific Company, 709 Forbes Street, Pittsburgh, Penna. 1044 pp.

Dedicated to the memory of Louis Pasteur this book of modern appliances for chemical, biological and metallurgical laboratories is much more than a mere catalog of appliances featured and sold by Fisher Scientific; it is a reference book of instruments which have kept pace with recent advancements in science and improvements in methods and technique. Details of hundreds of appliances, each one designated by specification number, are given. Every page carries a marginal index of its contents for convenience, in addition to a complete alphabetical index. There is also a special A.S.T.M. index for the convenience of manufacturers following those methods. A wide variety of laboratory appliances designed especially for use by rubber chemists and technologists is part of this valuable book.

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1934 REPORT OF THE RUBBER RESEARCH INSTITUTE OF MALAYA. Edited by B. J. Eaton. Published by the Institute, Kuala Lumpur, F.M.S. 175 pp.

The annual report of the many divisions of the Rubber Research Institute of Malaya contained in this condensed version reveals that investigations have been conducted from every angle concerning rubber from cultivation to production of finished products. Of particular interest is the report of the Chemical Division which has spent a good portion of its available time investigating latex properties. This divisional report covers latex constituents, latex preservation and concentration, and clone latex. Additional investigations are still being carried on by the various divisions of the Institute.

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THE RUBBER INDUSTRY—1935. (A Bibliography). Prepared by P. W. Barker. Issued by the Leather and Rubber Division, Department of Commerce, Washington, D. C. 20 pp.

This abridged bibliography is intended for use by the student of the various problems confronting the plantation rubber industry and the rubber manufacturing industry. It has been compiled under seven headings, as follows: The Rubber Plantation Industry; The Rubber Manufacturing Industry; General Information on Rubber; Rubber Restriction and Government Control; Rubber Periodicals; Rubber Publications of the Department of Commerce; and Services on Rubber by the Leather and Rubber Division, Bureau of Foreign and Domestic Commerce. Owing to the requirement for brevity the booklet is not complete in its coverage, but is sufficiently comprehensive to accomplish its purpose.

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GOODRICH BATTERIES FOR TRUCKS AND BUSES: 1935-1936. Distributed by the B. F. Goodrich Company, Akron, Ohio. 16 pp.

Issued as a supplement to its series of salesmen's catalogs, Goodrich has made this booklet available to individual or fleet operators of trucks and buses. It includes a discussion of operating requirements of truck and bus batteries together with a description of Goodrich construction features. One page is devoted to truck and bus battery specifications. Other pages are devoted to an exposition of the battery power requirements for trucks and buses, including a lamp data table, and to replacement data on batteries.

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RUBBER—IS RESTRICTION EFFECTIVE? Prepared by Bankers Economic Service, 91 Wall Street, New York City. $1.00.

The fact that world rubber stocks have not been visibly depleted after one full year of restriction affords an incorrect view of the current situation and the future outlook, according to this survey. Pointing out that almost 100,000 tons more of rubber entered the world market just prior to restriction, the survey states that the present total is insignificant and predicts that the pinch of restriction will be felt by the end of the current year. The survey embodies five charts ranging from shipments and absorption of rubber to the trend of rubber futures prices.

Editorial Comment

Revive Annual Banquets

ONCE again we urge early revival of the annual banquet sponsored in past years by the Rubber Manufacturers Association. There is no doubt that these get-togethers do much toward improving the friendly relations of the members of the industry. The purpose of the dinners is not to gather together into a solid group a large number of rubber men to hear technical papers or to listen to addresses of business importance, there being the meetings of the Rubber Division and its various groups for the accomplishment of these valuable aims, but only to establish the spirit of camaraderie so essential to the well-being of any industry.

Now, more so than in the past several years, there are a number of excellent reasons to revive the annual banquets, the principal one being the continued improvement of business conditions. If revived the banquets will be certain to again attract large attendances sufficient to cover the costs of management, entertainment and the actual dinner. The good feeling aroused at the dinners lingers for months after the last song has been sung and the final morsel swallowed. By all means, let's revive those annual banquets!

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Save "Rubber Chemistry & Technology"

REPORTED withdrawal of its financial support from *Rubber Chemistry and Technology,* the official journal of the Rubber Division, of the American Chemical Society, by the Rubber Manufacturers Association, introduces a situation which makes precarious the continuance of that publication, or at least may make necessary a serious curtailment of its service to rubber chemists and technologists in either of two ways, a reduction in size of each issue or fewer issues annually.

Either of these two steps, or in fact any curtailment whatsoever, would be a blow to the advancement of rubber chemistry and technology in this country, and for this reason the probability of withdrawal of financial support by the R. M. A. is viewed with alarm in many quarters. There is no question that *Rubber Chemistry and Technology,* in the few years of its existence, has become the most valuable scientific and technical rubber journal in the world. It not only brings to the attention of rubber chemists and technologists the more important papers from all corners of the earth, translating into English those originally in foreign languages, but includes reviews of important books, catalogs, etc. It is filling too distinct a need to be curtailed in size or in scope, and must at all costs be continued on its present basis.

Two general sources of funds to carry on the excellent work of this journal suggest themselves. One is the rubber manufacturer; the other is the supplier of materials to the rubber industry. Rubber manufacturers should, either directly or through their association, arrange to contribute annually to the journal, which is particularly helpful to their technical departments. A similar amount should be added to the journal's income by increased advertising support from manufacturers and sellers of rubber chemicals and makers of rubber machinery and equipment who should be represented by advertisements calling attention to their particular products and facilities. It is faithfully read by hundreds of rubber technologists.

Immediate action is imperative. It is to be hoped that early steps will be taken by the two groups mentioned to assure the continuance of *Rubber Chemistry and Technology,* which has in the past been so ably and generously supported by the Rubber Manufacturers Association.

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A New Sales Angle

RUBBER manufacturers would do well to pay particular attention to the anti-noise campaigns now being conducted in several municipalities. These campaigns open outlets for the manufacture and sale of a variety of rubber products, some old, some new. For instance, one of the first moves made by the Police Department of New York City when Mayor La Guardia announced a campaign to hush the night noises throughout the five boroughs, was to conduct a series of experiments with rubber horseshoes for the horses used in traffic duty. The upshot of these tests was the determination to equip some 400 horses with rubber shoes not only in the interests of anti-noise, but also because they revealed possible economy over the familiar ordinary iron shoes.

This is but one angle. Another suggestion advanced is to secure legislation by the Board of Aldermen requiring home owners and landlords to equip the bottoms of heavy ash and garbage cans with rubber fenders. Although a suggestion of this type, advanced in this case by New York Sanitation Commissioner T. W. Hammond, leads to some complications in a city of the size of New York, it could be more easily overcome in smaller municipalities.

Tire manufacturers should be interested in the determination of New York's Department of Sanitation to equip as many of its trucks as possible with pneumatic tires. Trucks of older design are so constructed that it is impossible to equip the rear wheels with anything other than solid tires, but in these instances the front wheels have been pneumatic tired.

Additional items should suggest themselves to rubber manufacturers who should concentrate some sales attention on departmental heads in both small and large cities.

CURRENT • NEWS
of the Rubber Industry

OCTOBER, 1935

ORAL HEARINGS HELD ON GOODYEAR SUIT

Federal Trade Commission Attorneys Dispute Goodyear's Discrimination Figures in Connection with Sears-Roebuck Contract at Open Hearing

Final decision in the Federal Trade Commission's suit against the Goodyear Tire & Rubber Company alleging discrimination in the latter's contract to supply tires to Sears, Roebuck & Company, was drawn a step nearer when three commissioners heard oral arguments at Washington, D. C. on September 17.

Commission Attorney Haycraft charged that Goodyear gave Sears-Roebuck a "gross discrimination" of $41,943,007 on sales of tires during the eight years ended 1933, and that there was a "net discrimination" of $18,197,481. He also claimed that the contract between Goodyear and Sears-Roebuck provided a cost plus basis which exempted advertising and selling cost. He further charged that such a contract was in itself discriminatory against other dealers who were charged for these costs, and that the contract provision for a profit of 6 to 6½% on calculated cost was less than the profit on sales to other dealers.

Goodyear attorneys disputed the "net discrimination" figures advanced by the Commission attorney, submitting a figure of $7,985,439, or only 4.46%. (The Commission attorney charged a discrimination of 17%). They also claimed that Haycraft included "extraneous" and "fictitious" items, and stated that they saw no reason why selling expenses and advertising for Goodyear's own tires, which competed with the Sears-Roebuck brand, should be charged against Sears-Roebuck tires.

It was agreed between the two interested parties, according to Goodyear attorneys, that no reference would be made that Sears-Roebuck tires were built by Goodyear and that Sears-Roebuck would not be charged with the advertising costs of Goodyear marked tires. On the strength of this agreement, they attacked Trial Examiner Bennett for concluding that it was generally known Goodyear made Sears-Roebuck tires "on the inconclusive evidence of only a few dealers." They also cited an advertising survey made by Goodyear in 33 cities which showed that in only 17 instances, or less than 1% of the advertisements studied, was it obvious that Goodyear made tires for the mail order house.

Additional objections by Goodyear to the Examiner's findings included the treatment of expense items in his profit and loss statement, the company arguing against the exclusion from the Goodyear dealer volume of the sales and expenses in connection with Goodyear tire sales to accounts known as "bus and taxi mileage accounts." Goodyear attorneys also objected to the equal proration between dealer business and Sears-Roebuck business of Goodyear's total administrative expenses.

With the conclusion of the oral arguments the Federal Trade Commission must decide whether to uphold or reject Goodyear's exceptions to the Trial Examiner's report either wholly or in part. After such decision is rendered, probably in the next few weeks, attorneys for both sides will file briefs on the legal aspects of the case. Final arguments on this phase will not be held for several weeks, possibly months.

According to Commission Attorney Haycraft, the F. T. C. may make at least three findings in the case, as follows: it may find that the original contracts with Sears-Roebuck were illegal in the light of the Clayton anti-trust laws and, therefore, null and void; it may find that the execution of the contract was illegal and order necessary "legal adjustments;" or it may find that there was no violation of contract or execution.

In the event that the Federal Trade Commission, in its final decision, finds that Goodyear discriminated in its contract with Sears, Roebuck & Company, it is certain that Goodyear will file an appeal in the Federal Courts. In all probability the case will go as high as the Supreme Court, if the Commission finds discrimination, which indicates a period of several years before a final decision is reached.

Sunflower Experiments

According to Professor V. Vershkovsky, Russian scientist, who has been experimenting at Rostov-on-Don, the ordinary sunflower contains a substance akin to rubber, which, if extracted from a sufficient quantity of sunflowers, will result in a mass of rubber or, at least, a substance so like rubber as to be virtually the same. Professor Vershkovsky claims that the greatest quantity of this substance is found on the leaves of the flower forming, in some varieties, as much as 2% of the total leaf composition. Later in the year he intends to make an experiment with several tons of sunflower leaves and hopes to evolve a mass of genuine rubber.

Continental Sues Firestone

The Continental Rubber Company, of Erie, Pennsylvania, filed suit against the Firestone Tire & Rubber Company of California, and its subsidiary, the Xylos Rubber Company of California, both of Los Angeles, in the Federal Court at Wilmington, Delaware, on September 19. The suit alleges infringement of U. S. Patent 1549177 covering improvements in rubber molding apparatus. The bill alleges that a patent was issued to John F. Allen, Edwin E. Allen and J. A. Himrod on August 11, 1925, and was subsequently assigned to Continental on August 26, 1929.

GOODRICH SUES GROUP TO ELIMINATE DOUBTS

Suit Asks Supreme Court of New York County to Rule on Validity of the Total Amount of Proxies Approving the Company's Refinancing Program

To eliminate any possible doubts with regard to the validity of the proxies received from stockholders in the amount of 75% of each class of Goodrich outstanding stock favoring the issuance of the proposed $45,000,000 refunding and refinancing program, the B. F. Goodrich Company, of Akron, filed suit against Otis & Company, William H. Hunt, William G. and Ernestine Benedict, and Louise Didsburg, in the Supreme Court of New York County, in New York City, on September 12, seeking a declaratory judgment. All of the defendants named are stockholders or stockholders' representatives opposed to the plans advanced.

The purpose of the suit, according to the petition filed, is to secure legal sanction from the courts before proceeding with the issuance of $28,000,000 mortgage bonds, the first step in the refinancing program. Such sanction is essential, according to Goodrich, before issuance and sale of the bonds because of the possibility that the question of stockholders' approval might be raised by other litigation.

The court was specifically asked to declare that at the July stockholders' meetings the proposal to mortgage Goodrich properties and franchises was approved by 75% of each of the preferred and common stockholders.

William H. Hunt, a former Akron banker and a large holder of Goodrich preferred stock, one of those named in the action, challenged the Goodrich management on the suit, stating that "the whole question is not whether the proposed issue shall be sold, but whether the management which proposed it and which is responsible for Goodrich's declining prestige shall be allowed to remain in power." According to report Mr. Hunt is preparing to call a stockholders' meeting some time this Fall and is also interviewing large Goodrich stockholders urging them to join in seeking a change of management. He declared that present policies "have resulted in tremendous losses in the last five years while leading competitors were showing substantial profits."

An official statement from the Goodrich management, explaining the reasons for the suit instituted in the Supreme Court, stated that "an effort will be made to have the case brought to trial at the earliest possible date." The refinancing program, it is presumed, will be deferred pending a decision by the court.

R. I. RUBBER CLUB HOLDS ANNUAL FALL MEETING

The annual Fall meeting of the Rhode Island Rubber Club was held on Thursday, September 19, at the Metacomet Golf Club, East Providence, R. I. Ninety-five members and guests were in attendance. The high-lite of the meeting was the golf tournament which preceded the usual business session. C. B. Round, playing unusual golf, took high honors for the day with a low score of 68, which is 4 under par for the course.

In addition to Mr. Round the following received prizes: low gross for club members, F. R. Fitzpatrick, Respro, Inc.; bogey for members, G. W. Smith, The Barrett Company; low bogey for guests, R. Edson, Anaconda Wire & Cable Company; low net for members, J. G. Collins, Naugatuck Chemical Company; and low net for guests, C. H. Muehlstein, Muehlstein & Company.

The feature of the business session was a paper delivered by Mr. A. E. Benson, of the Fisk Rubber Company, on "Pneumatic Tires." Mr. Benson discussed design and construction, covering the many factors involved in the determination of patterns, heights and depths. He stated that "the weather man has more effect on tread wear than anything a tire engineer can do." He outlined the various steps connected with the eventual selection of a pattern from the crude drawing to the finished product. He also discussed the reasons why "constructions" are changed from time to time and the steps taken by tire manufacturers to keep abreast of these developments. Mr. Benson injected a little tire history into his paper telling his audience the whys and wherefores of the super low pressure balloon tires. In concluding his address he pointed out the importance of continuous research work both in actual road tests as well as in laboratory work.

Prizes for the golf tournament were contributed by the following companies: E. I. du Pont de Nemours & Co; Muehlstein & Co.; Davol Rubber Co.; U. S. Rubber Co.; Bakelite Co. (Halowax Division); D. M. Litter Co.; Naugatuck Chemical Co.; Rubber Service Laboratories Co.; R. T. Vanderbilt Co.; Philadelphia Rubber Works Co.; Pequanoc Rubber Co.; Henry L. Scott Co.; and Respro Mfg. Company.

NEW YORK RUBBER GROUP HOLDS DINNER-MEETING

The annual Fall dinner and meeting of the New York Rubber Group was scheduled for the night of Friday, October 11, at the club rooms of the Building Trades Employers Association, at 2 Park Avenue, in New York City. Members of the Society of Rheology, which was also scheduled to hold its 7th annual meeting on October 11 and 12 at the Bell Telephone Laboratories' Auditorium in New York, were invited to attend the meeting and dinner of the rubber group.

Following the regular dinner, two interesting papers were to be delivered, the first of these being "Unusual Uses of Rubber," by Carl Zieme, technical superintendent, Republic Rubber Company, the other on "Methods of Plasticizing Rubber," by Ira Williams and C. C. Smith, research chemists associated with the Jackson Laboratories of E. I. du Pont de Nemours & Company, Inc. Further details concerning these two papers will be reported in the next issue.

Rubber-Shod Traffic Horses

In keeping with the anti-noise campaign recently launched by Mayor LaGuardia, the Police Department of New York City announced on September 21 that 400 of its horses used in traffic work are to be shod with rubber horseshoes. Tests conducted by the Department have shown that these shoes, besides being noiseless, are non-skid and wear longer than the time-honored iron shoes. As soon as arrangements for manufacture are concluded the 400 traffic horses will be rubber shod. This is the second progressive step along these lines in New York City, many of the leading dairy companies engaged in delivering milk to homes having already shod the horses pulling their wagons with rubber horseshoes.

ORIGINAL TIRE PRICES CUT BY MANUFACTURERS

According to reports from Akron tire manufacturers have dropped prices on original equipment tires to practically production cost. During the past year tires for original equipment have been sold to auto manufacturers at cost plus 10% as a result of cooperation between the tire manufacturers.

The lowering of prices, said to have been started by one of Akron's leading tire producers (who is understood to have landed several contracts which in recent years have been going to two other manufacturers), reflects a concerted effort on the part of the principal tire makers to capture a larger share of the primary tire market. Because of the 60 day advancement of the annual automobile exposition this year the market for original equipment tires is assured a decided pick-up in the usually slack autumn months.

It is also believed that the poor showing of the replacement market in the first six months of the year had some bearing on the decision to drop prices on original tires. Automobile manufacturers have almost unanimously adopted a spare tire as standard equipment cutting still further into the replacement market.

The news of the lower prices on original tires followed shortly after reports from Akron that selling prices for replacement tires were to be advanced 8 to 15% on or about October 15.

Deride German Rubber Claims

According to reports from London, Mincing Lane has received Herr Hitler's recent announcement that Germany had perfected her process for the production of synthetic rubber with great scepticism. One authority, pointing out that his investigations in Germany revealed an almost impassable cost barrier as compared with natural rubber, stated that consumers are complaining bitterly about the quality of the synthetic rubber currently produced. Although Russia, too, claims the production of a synthetic rubber equal to natural rubber, Mincing Lane brokers pointed out that both Russia and Germany come into the London market as heavy buyers of natural rubber whenever they secure the necessary foreign exchange.

LITCHFIELD DEPLORES TIRE SALES SITUATION

In an interview granted to the press on October 1, P. W. Litchfield, president, Goodyear Tire & Rubber Company, Akron, stated that there is no apparent immediate solution for distribution and retail sales ills of the rubber industry. He also emphasized the point that the downward swing in yearly total of tires sold for replacement has not yet reached bottom. Statistics and charts, the result of a survey of the entire rubber industry from 1914 to 1935, showed the problems faced by managements during that period.

Asked to comment on the reasons for constant internal strife within the rubber industry the Goodyear president admitted that increase in the number and variety of tire merchandising outlets combined with a shrinking number of units annually sold, was responsible for continual turmoil in price structure.

"We can't even control so simple a thing as the guarantee under which tires are sold. The 'unlimited' guarantee is costing the tire business $7,000,000 a year in adjustments which should not be made," Mr. Litchfield stated.

Formerly, the industry operated under a "standard warranty" which guaranteed tires to the customer against "defect in materials and workmanship."

The unlimited present guarantee was "forced on the industry" because a large chain of gasoline and oil stations wanted a startling selling feature when they adopted distribution of tires, he said.

Under the plan, tires are replaced no matter what accident or abuse causes the tire failure and the oil company is willing to take the loss in order to have this sales advantage.

Retail sales outlets for tires have jumped from 75,000 in 1929 to 185,000 this year, statistics show, while the total number of tires being sold has shrunk.

Mr. Litchfield estimated total production of tires for 1935 at 47,500,000 and 1936 at 48,300,000, while the 31 manufacturing plants left in the country have a total production capacity of 68,175,000 tires in a working year of 250 days.

Another important factor is the 55 per cent increase in the mileage tires have been made to give during the last 10 years while retail prices have been dropped about 50 per cent.

How quality betterment has caused the market to shrink despite the increased use of automobiles is shown by the fact that about eight tires were required per year for cars in 1914 and 1915 when fabric tires dominated production compared to the present one-quarter "airwheel" cord tires required annually for replacement.

An amazing mortality of tire manufacturers has occurred in the last 21 years. In 1914 there were more than 600 firms in the manufacturing business. The recent absorption of two small firms dropped the present total to 31.

Rubber Exhibit in Museum

Included among several industrial exhibits currently on view at the Baldwin Museum in Massillon, Ohio, is one sponsored by the Massillon Rubber Company. The exhibit consists of products featured by the company including surgeons' gloves, drainage tubes, examination cots, and additional surgical supplies of rubber. The Massillon Rubber Company, which has been operating since 1913, is known as one of the larger suppliers of rubber surgical goods.

RUBBER WORKERS FORM INTERNATIONAL UNION

Under the name of United Rubberworkers of America, labor employes of rubber factories from all sections of the country have formed an autonomous international union, which, according to reports from Akron, is completely free from control by the American Federation of Labor, although it will cooperate with that organization to the fullest extent.

Meeting in Akron in mid-September, the conclave was featured by a series of bitter arguments with regard to acceptance of a charter and the selection of officers. William Green, A. F. of L. president, attempted to install Coleman C. Claherty, one of the Federation's organizers, who is credited with having organized rubber labor in Akron two years ago, as president. The delegates to the convention insisted on electing their own officers which they finally accomplished despite Green's threat to withhold financial support unless Claherty was put into office.

Sherman H. Dalrymple, president of the Goodrich local, was elected president of the new international union defeating Thomas F. Burns, of the Fisk local, the latter being chosen vice-president at a subsequent meeting. Frank Grillo, of Los Angeles, was elected secretary-treasurer.

After the convention was concluded a committee of members was reported to have called upon Mr. Green, at Washington, that meeting being said to have resulted in a promise of both financial and moral aid to the new union from the American Federation of Labor. Under the new set-up, the Rubberworkers of America have the right to conduct their own financing problems and to call strikes at any rubber factory without receiving approval or sanction from the A. F. of L.

YOUNGSTOWN TIRE MAN BUYS SUPERFLEX PLANT

George J. Rheuban, president and general manager of the Standard Tire Stores, Inc., of Youngstown, Ohio, purchased the factory of the Superflex Cord Tire Corporation, East Palestine, Ohio, on October 3, consummating a series of negotiations which have been under way since early summer.

According to report, production of automobile and light truck tires of conventional construction will be started at the Superflex plant early in November. Repairs are already under way with employes being selected. The factory will employ some 100 persons when fully active.

Operations at the Superflex company, sometimes referred to as the National Tire & Rubber Company, were suspended about seven years ago. The new owner, Mr. Rheuban, has been a resident of Youngstown since 1906, and has been engaged in the tire business for the past twenty years.

GOODRICH STRAITS HEAD CITES JAPANESE TRADE

M. A. Cheek, managing director, Goodrich Straits Settlement Company, with headquarters at Singapore, on his arrival in the United States at Los Angeles on October 3 stated that the Japanese are exercising a profound influence as operators and carriers of rubber.

With reference to restriction, Mr. Cheek said that the Southern Orient, which produces a large portion of the world's total rubber supply, will have an output of some 950,000 tons for 1935 due to the restriction agreement, and that this amount would be cut to about 850,000 tons "to balance production and consumption" next year.

Although he would not elaborate on his statement concerning the growing importance of Japan in the rubber market, another source is reported to have advised that Japanese interests are manipulating trade by buying, selling and routing shipments of all kinds on Japanese vessels.

Dunlop Omits Dividend

The Dunlop Rubber Company, of England, has announced a decision of its board of directors against the payment of an interim dividend on the ordinary (common) stock. No interim dividend was paid last year, although the board reported improved trading conditions. When the full accounts were issued the earnings for 1934 amounted to 14% and a dividend of 8% was paid. The same dividend was paid for 1933. In announcing the current omission, the board stated that the volume of business has been maintained, but that the rise in raw materials and the lag in adjustments of selling prices, coupled with unstable conditions abroad, resulted in the decision.

TIRES OF AMERICAN MAKE FAVORED IN PHILIPPINES

Japan was the only foreign tire-exporting country offering United States makes any appreciable competition in the Philippines in the first 6 months of 1935, according to a report from American Trade Commissioner J. Bartlett Richards, at Manila.

Of total imports of 50,925 pneumatic automobile casings in that period, the United States supplied 50,080, or 98 per cent; Japan, 693; Great Britain, 100; Canada, 40; France, 10 and China, 2. Japanese exporters also were the second largest suppliers of inner tubes, although the United States supplied 40,984 of a total of 41,987, while Japan shipped 857 and Great Britain, 147.

Tire distributors are hoping for better business in the second half of 1935. There is a fair export market for most Philippine agricultural products, and prices are better than at this time in 1934. There will, of course, be a seasonal slump in the period July to October, and the tire business will be particularly affected by the rainy season, owing to the condition of many of the provincial roads which are impassable after heavy rains.

To Publish New Text Book on Uses of Latex

Said to be the first comprehensive text book covering the practical application of latex, THE RUBBER AGE announces the publication, on or about November 20, of "Latex in Industry," written by Dr. Royce J. Noble, noted latex research worker. The book, which will be approximately 380 pages in length, will sell for $7.00 per copy.

Divided into two sections, "Latex in Industry" will consist of 24 chapters, each featuring a bibliography at its end to facilitate the work of research chemists desiring to more fully investigate any particular use of latex. The first section, which comprises ten chapters, covers such topics as latex sources, preservation and shipment; properties; concentration; artificial latices; vulcanized latex; compounding; and examination. The second section discusses the many applications of latex including technical applications; impregnation; spreading; dipping; molding; electrodeposition; artificial leather; rubber thread; porous rubber; friction elements; adhesives; rugs and plush; and miscellaneous uses.

The author, Dr. Noble, has maintained a comprehensive set of notes recording the devious steps in the rapid progress of latex and its widespread commercial development over a period of years. From these notes, plus a long series of actual studies and investigations, the subject matter of the new book was derived. It fills a long apparent need for a text book covering specific uses of latex, and is amply illustrated with photographs, drawings, charts, etc.

Dr. Noble is well fitted to write a book of such interest and importance. Graduated from Boston University in 1919, receiving a B.S. degree and serving as assistant to the head of the chemistry department for nearly all of his college course, he spent the next three years in graduate work at Harvard University and the University of Pittsburgh, receiving a doctorate from the latter institute. It was during his graduate work, which covered a rather broad field, although he majored in organic chemistry, that Dr. Noble had his first contact with industrial colloids including latex, and his interest in the subject dates from that time.

From 1920 to 1922 he served on the staff of the Department of Chemistry at the University at Pittsburgh and from 1922 to 1925 as instructor in chemistry at Lowell Textile School and at Franklin Union, Boston, also operating an analytical and testing laboratory during this time. In 1925 Dr. Noble joined the staff of W. B. Pratt, Inc., engaging chiefly in development work on the application of artificial dispersions of rubber and their manufacture.

In 1929, when the interests of Pratt were transferred to the Dispersions Chemical Company, Dr. Noble joined the Dewey and Almy Chemical Company as a chemical engineer in charge of development work on the uses of dispersions of rubber in the manufacture of the company's products, particularly their line of can-sealing compounds.

From 1930 to 1932 he was chief chemist of the Goudey Gum Company, Boston, engaged in research and development in the application of latex in the manufacture of thermoplastic materials. During 1932-3 he was with the Pepperell Mfg. Company engaged in the development of methods of applying latex in textile finishes which involved all types of saturation and spreading methods and which resulted in the production of several new materials. Since completing that work Dr. Noble has been engaged in consulting work on rubber latex for the Heveatex Corp. and many other concerns.

Holder of several latex patents, Dr. Noble is also noted for his work on processes for manufacture of rubber powder and for concentration of latex, both of which are now in the development stage in Malaya. He is also the author of a number of articles on latex which have appeared in rubber and textile journals.

NEW ENGLAND NEWS

Nine Connecticut rubber manufacturers were represented in a comprehensive exhibit of the state's rubber products at the Connecticut Tercentenary Industrial Exposition held October 2 to 12 at the State Armory, Hartford. A front table display showed masses of crude rubber, while another section illustrated the evolution of rubber from the crude to the finished product. A complete line of products, such as rubber sneakers, boots, tires and hot water bottles was shown. One section demonstrated the manufacture of rubber from corn by synthesis.

Companies participating were the Armstrong Rubber Co., West Haven; H. O. Canfield Co., Bridgeport; H. P. & E. Day, Inc., Seymour; E. I. du Pont de Nemours Co., Fairfield; U. S. Rubber Products, Inc., Naugatuck; Goodyear Rubber Co., Middletown; Seamless Rubber Co., New Haven; Sponge Rubber Products Co., Derby; and Stamford Rubber Supply Co., Stamford.

In the chemical section of the Tercentenary show was a special display by the Naugatuck Chemical Company, Naugatuck, which showed rubber reclaiming, latex and dispersions, metal covering, rubber labels, heavy chemicals, rubber chemicals, perfumery products and plastics. Also in the chemical section, The Zapon Company, Stamford, showed a variety of its products, including plastic articles, belts, handbags, etc.

The American Cyanamid & Chemical Corp., manufacturer of chemicals widely used by rubber plants and in other industries, has purchased a five-story factory on the Boston Post Road in Stamford, Conn., which will be used for central research, development and sales service laboratories.

The plant, built about eight years ago for The H. E. Verran Company, makers of silk floss, and vacant several years, contains floor space of about 260,000 square feet and is air conditioned. The property consists of 12 acres of land and has a Post Road frontage of 900 feet. It is one of Connecticut's outstanding industrial landmarks, standing near the border line of Stamford and Old Greenwich.

The plant will be known as the Stamford Laboratories of American Cyanamid. Principal plants of the parent company are located in Warners and Bound Brook, N. J., and Niagara Falls, Ont. General offices are at 30 Rockefeller Plaza, New York City. Acquisition of the huge Stamford plant will make possible expansion of the company's laboratory facilities on a broad scale. Sales service research will be greatly increased. About 200 chemists will be employed at Stamford, it is understood.

Directors of the Norwalk Tire & Rubber Company, Norwalk, Conn., have voted a quarterly dividend of 50 cents a share on preferred stock, payable October 1 to stockholders of record September 20. In previous quarters the company has paid 87½ cents.

The Norwalk company is steadily increasing its production of batteries, and that department is now one of the plant's largest, supplementing the manufacture of tires, tubes, fan belts, radiator hose and other items.

The former plant of the Revere Rubber Company in Chelsea, Mass., was swept by fire September 17 with loss estimated at $20,000. The building has been used lately as a storehouse for waste paper and rags by the North Shore Waste Paper Company, of Lynn.

Harold S. Guy, president of the Goodyear Rubber Company, Middletown, Conn., rubber footwear plant, has been elected a vice-president of the Central National Bank, Middletown, and its affiliate, the Middletown Trust Company.

On Saturday, September 21st, at the Locust Valley Club, Attleboro, Mass. the golf team of Anaconda Wire & Cable Company, Pawtucket, R. I., defeated a team representing the Davol Rubber Company, of Providence, R. I., the final score being 11½ to ½. Dolan, of the winning team, stole the show with a hole in one on the 8th hole. Anaconda's team was composed of the following: Morley, Thompson, Allman, Dolan, Reeck, Pipes, Rupert and Edson.

Rubber Powder Firm Expands

The Rubber Powder Company, Ltd., of England, owners of the patented process for making powdered rubber from latex, is being converted into a public company with a change of name to the International Rubber Powder Company, Ltd., with a nominal capital of £250,000 (approximately $1,250,000) in 2s. shares, of which 2,140,000 will be common, and 360,000 preferred. A public issue of the shares is expected to be offered shortly. Arnell Thorpe, a member of the British Pacific Trust Board, is a leading personality on the board of directors.

Lee Mechanical Goods Gain

Another indication of improved business conditions is seen in the report of A. A. Garthwaite, vice-president, Lee Rubber & Tire Corporation, Conshohocken, Penna., stating that August bookings of the company in its mechanical goods division were the largest of any month since April, 1930. New business booked during the month by Republic Rubber Company, Lee subsidiary, is reported to have totaled $281,000, an increase of 60% over August, 1934.

R.M.A. Closes All Branches

With the rubber code eliminated from consideration, the Rubber Manufacturers Association has closed all of its 13 field offices, 10 of which were closed several weeks ago. The only remaining office now being operated is the main office at 444 Madison Avenue, in New York City, under the supervision of A. L. Viles, president and general manager.

Goodrich Issues Football Log

Covering the 1935 schedules of 198 prominent college teams from coast to coast, the B. F. Goodrich Company is distributing a football schedule booklet through its dealers. The log gives complete 1935 schedules and 1934 results. It also contains 1934 All-American selections, a glossary of football terms, an illustrated code of gridiron signals, and other data.

GOODYEAR PURCHASE ENDS LEASE DISPUTE

Ending a controversy which has been both bitter and long, the Goodyear Tire & Rubber Company, on September 24, purchased 74.65 acres of land from the Robinson Clay Products Company for the sum of $1,962,500. The disputed acreage was once the site of a clay pit operated by the Robinson concern and is now occupied by Goodyear Plant 3. It is on Seiberling Avenue, in Akron.

The original rental of the property called for an annual payment of $120,000 until 1920 and $150,000 per year since that date. In all Goodyear has already paid $1,890,000 in rent for the property. The purchase was one of the largest in the history of Summit County.

Charges and counter-charges have been filed in the law courts over this property for a long span of years. In May of last year Goodyear attorneys, in answer to a petition of the Robinson company asking that the lease be validated, claimed that family interests of H. B. Manton, president of Robinson and a Goodyear director, and his brothers-in-law, F. A. and C. W. Seiberling, both officers of Goodyear in 1920, had dictated the drawing of the lease at "an exorbitant rental."

They also charged that a "scheme" was perpetrated between F. A. Seiberling and Manton in allegedly altering a duplicate of the contract. Additional charges were also made. Upon purchasing the property in question, however, President Litchfield, of Goodyear, issued a statement expressing his regret and that of the company's directors for such charges which he termed "unsupported."

UNITED STATES TIRES PREFERRED IN BRAZIL

United States tires were obtaining 56% of the total tire business in Brazil at the end of June, 1935, according to the Department of Commerce, as compared with 54% during 1934. This slight increase is interesting in view of the fact that the trade this year is about 22% under that of the corresponding six-month period last year.

A Brazilian company has completed erection of its factory and it is anticipated that by the first of September it will be in production of automobile tires, under the supervision of American technicians. Initial production schedules are about 200 tires daily.

Japanese Bridgestone tires entered the Brazilian market in February, and 2,274 of these tires were imported in the first 6 months of 1935.

Tire sales prospects appear very encouraging for the rest of 1935. Heavy demand for truck tires is expected from cotton growers and calls for tire replacements from owners of new cars purchased in 1934.

Rubber Factory for Norway

A rubber goods factory is soon to be erected near Bergen, Norway, the City Council of Bergen already having given its approval of the plant, and also offering financial support. Construction activities will be under the supervision of Mr. Ivar Bull, said to be an experienced engineer in the construction of rubber manufacturing factories.

Names in the News

CLIFFORD L. HEASLIP, associated with the Siemon & Elting Corporation for the past fourteen years, has joined the sales division of Wishnick-Tumpeer, Inc., and will operate out of the New York offices.

JOSEPH B. HANAN, staff superintendent, mechanical goods division, B. F. Goodrich Company, Akron, was appointed to the board of trustees of Kent State University (Ohio) last month. His term will expire May 17, 1937.

BROWNIE CARSLAKE, sales instructor, Firestone Tire & Rubber Company, Akron, was one of a group of speakers to address the 26th annual ocnvention of the Ohio Association of Real Estate Boards in mid-September at Akron.

A. S. BISHOP, general sales manager, Goodyear Tyre & Rubber Company, Ltd., of England, was a visitor to Akron last month, his first visit to the home offices in six years. He has been with English Goodyear for the last twenty years.

DR. WALLACE H. CAROTHERS, noted DuPont chemist sailed on the Bremen on September 18 to address a scientific society in Cambridge, England. He is well-known for his work in connection with synthetic rubber.

LEE KONN CHIAN, an important factor in the Singapore rubber trade, arrived in New York City on September 24 to confer with interests in the American crude rubber market. He is on an extended world tour.

H. M. STRAUB, tire engineer, B. F. Goodrich Company, Akron, was given a farewell party at the Fairlawn Country Club on September 18 prior to his departure for Mexico City to assume new duties of supervising tire construction with Euzkadi, Goodrich's Mexican affiliate.

T. I. PHILLIPS has been appointed general works manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Penna. In his new position he will serve as central authority for all Westinghouse manufacturing operations.

GEORGE A. WADDLE, assistant sales manager, Goodyear Tire & Rubber Company, Akron, has been named to serve on the executive, finance and budget, and alumni cooperation committees of Bethany College, Bethany, West Virginia.

FRANCIS A. SEIBERLING, president, Seiberling Rubber Company, Akron, and chairman of the Akron FHA Committee, was master of ceremonies at a banquet on September 12 at the Hotel Mayflower which launched Akron's "mortgage clinic."

GEORGE OENSLAGER, of the Goodrich research staff, has returned to the Akron laboratories after a 10-week trip during which he visited the countries bordering on the Mediterranean Sea and the Grecian Islands.

R. W. COLLINGS has been appointed manager of the sales promotion department for the tire division of the United States Rubber Company, New York City. He was formerly district manager of tire sales at Pittsburgh.

DR. ERNST A. HAUSER, who was recently appointed Associate Professor of Chemical Engineering at the Massachusetts Institute of Technology, Cambridge, Mass., arrived in this country on September 21 to take up his new duties.

K. D. SMITH, technical superintendent, tire division, B. F. Goodrich Company, Akron, was one of several Goodrich engineers to attend meetings of the Society of Automotive Engineers held in Cleveland last month.

JOHN L. HANDY has been appointed advertising manager of the R. & H. Chemicals Division of E. I. du Pont de Nemours & Company, Wilmington, Delaware, to succeed the late JOHN A. LYTER.

W. G. MANLEY, until recently associated with the Rubber Manufacturers Association, as manager of the district field force, has been named New York District Sales Manager for Kelly-Springfield. He has previously been associated with Firestone and Goodrich.

COLONEL A. F. TOWNSEND, chairman of the board, Raybestos-Manhattan, Inc., Passaic, N. J., attended the September 24th meeting of the International Rubber Regulation Committee in London in his capacity as the American delegate of the Advisory Committee.

C. C. SHIPMAN has been appointed staff superintendent of the tire division, B. F. Goodrich Company, Akron, succeeding D. REICHOW. The latter has been named full-time conference leader of Goodrich educational programs.

DR. J. C. PATRICK, director of research, Thiokol Corporation, Yardville, New Jersey, sailed in mid-September to attend a meeting of the Faraday Society at Cambridge University, London, during which he was scheduled to deliver an address on "Polymerization of Dichloride of Ether with Sulfur." He is expected to return about October 15.

J. E. HALE, development engineer, Firestone Tire & Rubber Company, Akron, was scheduled to present a paper on "A Truck Tire Overload" at one of the sessions of the Society of Automotive Engineers' meetings at the Palmer House, Chicago, during the week of October 7.

HARVEY S. FIRESTONE, Sr., chairman of the board, Firestone Tire & Rubber Company, is acting as general chairman of the centennial celebration of St. Paul's Episcopal Church of Akron. He is also senior warden of the church.

DR. H. L. TRUMBULL, manager, chemical research, B. F. Goodrich Company, Akron, acted as host to Goodrich research workers on September 14 at his farm "The Acres" near Hudson, Ohio.

U. S. Truck Tires for Studebaker

The Studebaker Corporation has adopted U. S. Royal truck tires as standard equipment on its entire line of trucks. The Studebaker line ranges from 1½ to 4 ton models in size, with tire equipment ranging from 6.00-20 and 32x6—8 ply to 36x8—12 ply and 9.00-20.

Fifty Years of Rubber

Celebrating his seventy-fifth birthday on September 26, William Metzler, consulting superintendent of the Goodyear Tire & Rubber Company, Akron, recalled fifty years of service in the rubber industry. Mr. Metzler joined Goodrich in 1886, when the company had but 200 employes, remaining for six years. He then joined a Trenton, N. J., rubber firm spending the next five years in that city. In 1897 he returned to Akron, becoming assistant superintendent of the Diamond Rubber Company, where he worked out compounding practices and aided in the improvement of vulcanization methods. In 1912, when Diamond and Goodrich merged, Mr. Metzler joined Goodyear and has spent the last twenty-three years with that company. He vividly recalls the growth of the tire industry although the major portion of his experience was in the mechanical rubber goods line. Still hale and hearty Mr. Metzler is active in his job as consulting superintendent for Goodyear. A son, David, is manager of the Philadelphia Rubber Reclaiming Company, also of Akron.

Goodrich Managers Assemble

Directors and superintendents of several branch factories of the B. F. Goodrich Company assembled in Akron last month to attend a series of conferences under the direction of E. H. Barder, general superintendent of the tire division. Included among the executives, many of whom traveled thousands of miles to attend the sessions, were George Madole, assistant managing director and works manager of Goodrich's French division at Colombes, France; F. A. Nied, superintendent, Pacific Goodrich, Los Angeles; J. E. Gulick, superintendent, Canadian Goodrich, Kitchener, Ontario; and R. E. Moody, superintendent, Euzkadi, Mexico City. The conference was addressed by several Akron Goodrich officials.

Resigns Firestone Post

Colonel Charles E. Speaks announced his resignation as president of the Firestone Footwear Company, Hudson, Massachusetts, on October 1. He was associated with the Firestone interests since 1913 and has occupied various executive positions since that time, at one time serving as European manager for all of the Firestone rubber interests. In announcing his resignation Colonel Speaks stated that "the trying past 10-year period of the rubber industry has been largely due to mismanagement particularly in the distribution and sales divisions." He has not indicated whether he plans to join some other rubber organization, as yet.

Radio Program for DuPont

The first of a new series of radio programs was inaugurated on October 9. Known as the "Calvacade of America" the series is being sponsored by E. I. du Pont de Nemours & Company, of Wilmington, Delaware, and feature the slogan "Better Things for Better Living... Through Chemistry." In addition to the broadcasts, over the Columbia Broadcasting System and affiliated stations, DuPont will also feature a series of human interest advertisements monthly in the *Saturday Evening Post* stressing the chemistry appeal.

LOS ANGELES NEWS

Speaking before a gathering of 150 industrial executives who were his guests at a luncheon held in the tire plant in Los Angeles, R. J. Cope, president of the Firestone Tire and Rubber Company of California, prophesied that Los Angeles was destined to become the tire capital of the nation.

"An example of the more widespread use of rubber," said Mr. Cope, "is seen in the modern automobile which uses on the average 160 lbs. of rubber products as against the automobiles of a few years ago with only 60 lbs.

"With household, commercial, and industrial products being developed it will be only a comparatively short time until the industry here will be forced to expand materially."

The luncheon meeting was tendered to members of the manufacturing and industries committee of the Los Angeles Chamber of Commerce, which committee Mr. Cope heads, under date of September 23.

Charles N. Merralls, president of the Rubber Manufacturers' Association of California, announced on October 1 that the first fall meeting of the group would be held as an evening dinner meeting at the Jonathan Club, Los Angeles, October 9.

Mr. Merralls expected a large attendance and stated that the social atmosphere rather than the business atmosphere would be allowed to predominate at the monthly meetings again this year as during the year which closed with the June meeting.

No formal program was planned for the October meeting, the thought of breaking down all artificial barriers between competitors in the industry appealed to Mr. Merralls as being as good a business step as could be taken. Technical talks at some of the meetings during the fall and winter are within the possibilities, he stated.

"We are all much encouraged out here," says Mr. Merralls, "and the men in the group report to me that business is holding up in fine shape."

Thomas D. Campbell, owner of a 95,000 acre wheat farm in Montana and resident of Pasadena, said to be the largest wheat farmer in the world, envisages a new cycle of prosperity for the rubber industry. "Within five years," says Mr. Campbell, "every implement on the farm will run on rubber wheels, the plow being the only probable exception.

"The rubber industry can't miss," he continues, "for the potentialities of this market are enormous, and I am satisfied that the machines on the farms will use more rubber than the 25,000,000 or more automobiles now in use in America. For every tractor on the farm there are five other tools which will require rubber wheels including the combined harvester, the drill, and even the hay-rake."

In a series of experiments on his farm, acting with Harvey S. Firestone, Sr., Mr. Campbell has proved that the time saved through the use of rubber tired wheels on a number of implements more than offsets any additional original cost. With the equipment, especially heavy duty dual tires on tractors and trailing equipment, Mr. Campbell has speeded up operations from three to five miles per hour. The old horse drawn equipment without rubber footing moved at the rate of only 2½ miles per hour.

By hitching rubber-tired trailers to trucks the cost of transporting wheat to the railroad market place has been substantially reduced, according to Mr. Campbell. The forty-one mile haul formerly cost about three cents a bushel for gasoline, oil, and labor. The new methods show a cost of from .76 cents to one cent a bushel.

New Bolivian Tire Factory

A concession to build and operate a rubber factory in La Paz, Bolivia, was granted on September 18 by the South American government to an unnamed United States company. It is understood that when completed the factory will use rubber from several Bolivian areas, which is expected to meet all demands for manufacturing purposes. Until 1902 Bolivian rubber exports were among the principal items of the country's international trade, but swiftly lagged because of competition from plantations in the Far East. Samuel Howson, manager of the new enterprise, is shortly expected in the United States to purchase needed machinery, including tire equipment.

Zinc Oxide Prices Lowered

A general reduction in zinc oxide prices was instituted last month by leading manufacturers on practically all grades. Lead free grades were reduced ½ cent now being quoted at 5 to 5¼ cents per pound. Reductions on other special grades ranged from 2 to 4½ cents per pound. A complete schedule of the revised prices will be found on the "Chemical Markets" page in this issue.

Open Bombay Rubber Plant

The new rubber factory at Wadala, near Bombay, India, construction of which has previously been mentioned, has been completed and production is already in swing. The factory, owned by the Supreme Rubber Company, Ltd., is in charge of B. K. Modi as managing director. Although all production is currently under the supervision of a Japanese expert, it is planned to gradually train Indians to assume positions of importance. Present production is centered on sandals, tires and tubes for automobiles, bicycles and carriages, and a few mechanical rubber goods. It is believed that when the factory swings into full production it will be capable of producing 1500 pairs of sandals per day.

Firestone Leaves R.M.A.

Another result of the N.R.A. collapse was the withdrawal last month of the Firestone Tire & Rubber Company from the Rubber Manufacturers Association. Firestone, prior to the inception of the N.R.A., was not affiliated with the R.M.A., but during the life of the Rubber Code cooperated with it in its capacity as the Code Authority in furnishing certain statistics.

SPANISH TIRE IMPORTS SHOW SHARP REDUCTION

A marked reduction of tire imports into Spain, as a result of growing domestic production, is reported by American Assistant Trade Commissioner Miles Hammond, stationed at Madrid.

Spanish imports of casings in 1934 totaled 850,519 kilograms, valued at 2,145,214 gold pesetas, compared with 2,743,140 kilograms valued at 7,772,296 gold pesetas in 1933, a decline of 69 per cent. Imports in the first seven months of the current year, totaling 240,984 kilograms valued at 617,329 gold pesetas, were notably under the totals for the corresponding period of the two preceding years. The gold peseta has a value of about 33 cents in United States money.

An even more marked shrinkage was recorded in Spanish imports of inner tubes which declined from 216,643 kilograms, valued at 762,715 gold pesetas, in 1933, to 35,971 kilograms, valued at 222,848 gold pesetas in 1934, with figures for the first seven months of 1935 indicating a continued downward trend in this trade.

Great Britain, France, Belgium and Canada, in the order named, are the chief sources of Spain's tire imports.

Aetna Offices in Cleveland

In line with its recent decision to shift its activities from Ashtabula to Cleveland, Ohio, the Aetna Rubber Company has already moved its executive offices to the latter city. It is planned to remove manufacturing operations to Cleveland sometime in the future. Aetna, incidentally, has discontinued the manufacture of sheet rubber flooring.

OBITUARIES

George Millar, Jr.

George Millar, Jr., prominently identified with rubber activities on the West Coast, died suddenly in San Francisco on September 6 after an illness of a few days caused by an infected tooth. Until recently Mr. Millar was San Francisco agent for the Rubber Manufacturers Association. During the life of the NRA he was in charge of code regulation enforcement in Northern California. After the collapse of the NRA Mr. Millar devoted his time to the formation of several trade organizations. At the time of his death he was secretary of the Trade Association Executives.

Raymond D. Kinder

Raymond D. Kinder, well-known in rubber chemical circles, died at Miami, Florida, on September 26 at the age of 56. In 1910 he established a brokerage business in Chicago representing the Binney & Smith Company, C. K. Williams & Company, the Standard Ultramarine Company, and Innes & Company. Actively interested in the early beginnings of the Chicago Paint, Oil and Varnish Club, he was elected treasurer in 1912. In 1931 he retired from active business and took up permanent residence in Miami. Mr. Kinder is survived by two brothers, one sister and a nephew, Charles M. Baldwin, western sales manager of the United Carbon Company.

Restriction Notes

In answer to insistent demands on the part of both planters and shareholders for some action to further reduce world stocks the International Rubber Regulation Committee, meeting in London on September 24, fixed the export quota at 60% for the last quarter of the current year. Although no mention was made as to quota restrictions for the first quarter of 1935, it is believed that the 60% rate will be carried over. It is possible, however, that if London prices do not advance over the current 6d price in the next few months the quota rate for the 1936 January-March period may be further reduced.

Shortly after the 60% export quota set by the Regulation Committee for the last quarter of the current year was announced, the Dutch East Indies Government further increased its export duty to 22 guilders per 100 kilograms, dry weight, an increase of 2 guilders. The new tax is equivalent to about 6.74 cents per pound in American currency at the present rate of exchange.

According to reports, the purpose of this further increase is to impose upon native rubber the major share of the reduction called for by the new quota allotments, since the tax, which is effective as of October 1, will probably serve to reduce native exports in favor of estate rubber. *The Financial News*, of London, terms the new duty an "embargo," and points out that a substantial increase in the export duty rates will inevitably result in a decrease of native shipments, a point gladly welcomed by European producers.

From this move, and others taken by the Government, it is evident that the Dutch colonial authorities are tightening up regulations for the October-November-December shipment quarter in answer to insistent demands of the other countries involved in the restriction cartel.

Agitation on the part of Indian planting interests, seconded by the Indian Government, has led to a request to the International Rubber Regulation Committee to increase the standard production of rubber currently permitted India and Burma. Standard production allowed to India for the current year is 8,250 tons, and 6,750 for Burma. It is understood that the proposed increase is equivalent to about half as much as the present standard production permitted for India, and a little below that for Burma. Ceylon is permitted a total of 79,000 tons for 1935.

Over the objections of the Dutch Government, the People's Council at Batavia last month passed the estate rubber duty bill by a large vote. The bill, however, was amended so that the tax will commence with 1 (Netherland) cent per ½ kg. at a price of 18 cents per ½ kg., instead of with the ½ cent at a price of 17 cents as proposed in the original bill. At a price above 20 cents per ½ kg., ¼ cent more per ½ kg. will be levied for each full cent that the price is higher than 20 cents.

Shipments from Malaya during August totaled 40,985 tons, as compared with 37,718 tons in July, a decrease of some 3,000 tons. Shipments in August, 1934 amounted to 34,776 tons. For the first eight months of the year net Malayan shipments have amounted to 282,951 tons as compared with 294,881 tons in the similar 1934 period, a decrease of 11,930 tons. Stocks of crude rubber held by dealers in the Malayan colonies at the close of August were reduced by more than 6,000 tons over the preceding month, amounting to 39,818 tons as compared with 46,457 tons. The decrease in stocks, however, was partially offset by a 2,000 ton increase in stocks awaiting shipment at Penang and Singapore.

Shipments from Ceylon during August increased somewhat over July, the figures being 5,683 tons for August, compared with 4,106 tons for July. For the first eight months of 1935 Ceylon shipments amounted to 35,075 tons as against 50,802 for the similar 1934 period.

Huber Purchases Gas Lands

J. M. Huber, Inc., of New York City, recently purchased more than 12,000 acres of natural gas lands in the Texas Panhandle field, including several producing wells, from the Continental Oil Company. The company is also reported to have entered into a contract to supply "sweet" gas to the Panhandle Eastern Pipeline Company for its line to Indianapolis which is to be extended to Detroit. This contract is stated to be the first important one consummated under the provisions of the recently-instituted Texas conservation laws whereby the independent gas producer is allotted a share of the pipe line market on a rateable basis with the gas production of the various pipe line companies. In addition to its crude oil production and "sweet" gas interests, Huber also produces all the "sour" gas required for its carbon black factories at Borger, after the natural gasoline has been extracted in its own gasoline plant.

Building New French Factory

Plymouth Rubber Company, Inc., of Canton, Mass., has started installation of machinery for the manufacture of rubber thread in a new factory in Feyzin, France. The factory, when completely installed, will be operated by the Societé Plymouth Francais, according to Mr. Walter Bieringer, Plymouth vice-president, who returned from abroad last month after completing the necessary arrangements. Plymouth also operates a factory in Manchester, England, where products similar to those produced at Canton, such as friction tape, rubberized fabrics, etc., are manufactured for the British market.

Lifeguard Tubes for Trucks

Following the successful introduction of Lifeguard tubes for passenger cars, Goodyear Tire & Rubber Company, Akron, has announced production of the tubes for trucks and buses. The same construction used in passenger car sizes is being used in the larger truck and bus sizes.

AUGUST CONSUMPTION WAS 7.9% OVER JULY

Consumption of crude rubber by manufacturers in the United States for the month of August amounted to 39,242 long tons, which compares with 36,384 long tons for July, 1935. August consumption shows an increase of 7.9% above July and 18.1% above August, 1934, according to statistics released by the Rubber Manufacturers Association. Consumption for August, 1934 was reported to be 33,216 (revised) long tons.

Imports of crude rubber for August were reported to be 38,665 long tons, a decrease of 17.5% below the July figure of 46,830 long tons, but were 16.3% over 33,248 long tons imported in August, 1934.

Total domestic stocks of crude rubber on hand August 31st is estimated at 329,548 long tons, which compares with July 31st stocks of 330,528 long tons and 363,711 long tons on hand August 31, 1934.

August reclaimed rubber consumption is estimated at 8,795 long tons; production, 9,557 long tons; and stocks on hand, August 31, 1935, 18,272 long tons.

JULY TIRE SHIPMENTS WERE 27.8% OVER JUNE

Shipments of pneumatic casings for the month of July, 1935 amounted to 5,447,109 casings, an increase of 27.8% above June, and 31.0% above shipments made in July a year ago, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for July was reported to be 3,531,834 casings, a decrease of approximately 9.7% below June although 5.3% over July, 1934.

Pneumatic casings in the hands of manufacturers, July 31st, amounted to 8,849,503 units, a decrease of 17.7% under stocks on hand June 30th and 6.2% below stocks on hand July 31, 1934.

The actual figures are as follows:

	Pneumatic Casings		
	Shipments	*Production*	*Inventory*
July, 1935	5,447,109	3,531,834	8,849,503
June, 1935	4,262,360	3,909,832	10,755,400
July, 1934	4,157,411	3,352,836	9,436,816

Replacement Tire Sales Up

Sales of tires to be used for replacement increased in July of this year over June and were larger than July, 1934, according to the *Monthly Business Review*, published by the Fourth Federal Reserve Bank of Cleveland, Ohio. This increase is in direct contrast with the first six months of 1935 when replacement sales were about 15% below the same period in the preceding year. According to the report sales of tires for original equipment amounted to approximately 10,300,000 units in the first half of the year compared with 8,600,000 units in the first six months of 1934.

Liberian Rubber Imports

During 1934 the United States imported 63 tons of dry rubber from Liberia, in addition to 278 pounds in the form of latex, according to a report from the Department of Commerce. During the first seven months of 1935 the imports amounted to 340 tons of dry rubber and 72 tons in latex form, a total of 412 tons. These figures indicate regular production schedules are now in force in Liberia, the site of the Firestone plantations.

NEW FINANCIAL GROUP SECURES MIDWEST CO.

The Midwest Rubber Reclaiming Company, of East St. Louis, Illinois, heretofore controlled by the Akron Rubber Reclaiming Company, of Akron, has passed into the hands of a group of St. Louis (Mo.) financiers, the Akron concern relinquishing all control. This was accomplished on September 19 when Judge Arthur W. Doyle, of Akron, approved a compromise offer of the St. Louis group to settle a pending bank claim against the Akron Rubber Reclaiming Company.

According to reports, the St. Louis group paid $135,000 in cash, and $40,000 in certificates of claim against the bank to clear a $231,000 obligation due the bank by the Akron Reclaiming concern. In securing this loan from the bank Akron Reclaiming had pledged 27,850 shares, or 63%, of common stock of Midwest Reclaiming as collateral.

Although the deal gives control of Midwest Reclaiming to the St. Louis group it does not affect control of Akron Reclaiming, according to J. B. Huber, president of the latter company. He also added that Akron Reclaiming, which has been shut down for several months, may soon be able to continue operations, particularly if business conditions improve.

Harry Knight, one of the St. Louis financiers involved in the deal, was a backer of Colonel Charles A. Lindbergh's flight across the Atlantic in 1927.

Discusses Water Dispersions

Included in the September-October issue of *The Vanderbilt News* are two articles on water dispersions, i.e., "Improving the Quality of Dispersions" and "Making Dispersions of Complete Latex Formulas." The first of these two articles discusses the prevention of settling, frothing, thickening, and flocculation; the second is devoted to a method of combining all chemical ingredients to form a single dispersion. In addition to these two dispersion articles, the issue features articles on Darvan, Low-Sulfur Clothing Compounds, Copper Contamination of Latex Compounds, and others.

Open Travancore Factory

Amid gala ceremonies and in the presence of the Maharajah of Travancore, the Travancore State Rubber Factory, at Trivandrum, India, was opened late in August. Out of a total of 127,000 acres devoted to rubber cultivation in India, excluding Burma, 95,800 acres, or 75 per cent, are located in Travancore. The new factory, said to be fully equipped for the manufacture of motor and cycle tires and tubes, waterproof clothing, rubber toys, and other articles, is expected to absorb a large portion of local rubber production.

Find New Rubber Substitute

A new material which acts as a rubber substitute is reported to have been invented by the Mendelejes Institute, of Moscow, Russia. It is said to be a plastic resin made of minyl-chloride and may be used for the manufacture of chemical apparatus as well as by the leather substitute industries. Acetylene and hydrogen chloride are the chief raw materials used in making this new rubber substitute, the method of manufacture being stated to be simpler than that of producing synthetic rubbers.

Test Rail-Highway Truck

A new model rail-highway motor truck, made by the Hendrickson Motor Company for the General Transportation Company, of Boston, was tested recently in a run between Akron and Cleveland on the B. & O. Railroad tracks. The truck has combination wheels which carry special truck tires mounted besides steel flanged railway wheels. When driven on rails at any crossing the tires are deflated, the truck settling down on the tracks with its steel wheels. When leaving the tracks the tires are inflated by the same air system used for brake operation. Goodrich engineers developed the special truck tires used. The test was termed successful.

RUBBER EXPORTS SHOW INCREASE IN VALUE

Although the usual seasonal increase during the month of August over that of July is only 1.7 per cent, United States exports of rubber products during August, 1935, amounted to $1,861,556 as compared with $1,752,428 in the preceding month, a gain of 6.2 per cent, according to the Bureau of Foreign and Domestic Commerce.

Total exports of rubber products for the first 8 months of this year were valued at $14,623,158, which was 0.6 per cent less than those for the same period of 1934 and 42.7 per cent greater than for the 1933 months.

Comparisons of exports of groups of rubber products are as follows: tires, inner tubes, and tire repair materials, from $8,502,215 in the 8 months of 1934 to $7,744,622 in the 1935 period, a loss of 9 per cent; rubber shoes, boots, and heels and soles, from $411,158 to $596,086, increase of 45 per cent; rubber belting, hose, packing, and general mechanical rubber goods, from $1,950,386 to $2,104,450, increase of 8 per cent; rubberized fabrics, hospital sheeting, and piece goods, from $516,815 to $482,385, loss of 7 per cent; druggists' rubber sundries, specialties, from $844,323 to $818,807, loss of 3 per cent; hard rubber goods, from $192,020 to $245,768, increase of 28 per cent; semi-manufactured goods, from $1,467,436 to $1,529,849, increase of 4 per cent; other rubber products, from $823,255 to $1,101,191, increase of 34 per cent.

Annual MEMA Meeting Set

The annual members' meeting of the Motor and Equipment Manufacturers Association will be held at the Traymore Hotel in Atlantic City, New Jersey, on Tuesday, December 10, during the week of the Automotive Service Industries Show. It is scheduled to be an informal dinner meeting and will be attended by the representative member of each company or his alternate.

Goodrich to Redeem Bonds

Notice of redemption of a portion of its first mortgage 25-year 6.5% gold bonds on November 1 has been published by the B. F. Goodrich Company, Akron. The amount of the allotment is $642,000. Bonds designated by lot for redemption, according to the announcement, will be called at face value plus accrued interest.

EXEMPT ESTATE RUBBER FROM PAYMENT OF DUTY

The latest move on the part of the Netherlands East Indies government to gain complete control over rubber cultivation and shipments from its colonies in order to enforce restriction was indicated on October 7 when reports reached this country that further action favoring estate rubber over native rubber has been taken. According to the report, estate rubber which has been placed under customs control by December 31, 1935, will be permitted to be exported at any time during 1936 without the payment of the recently-instituted export duty. Such rubber will, however, be included in the tabulation of 1935 rubber exports.

It has been apparent, of late, that the Dutch government is making every effort to balance estate and native rubber shipments, although to date native shipments exceed estate shipments by several thousand tons. Native rubber is currently being assessed with an export duty of 11 Dutch cents per half kilogram, or 22 guilders per 100 kilos.

The Dutch government has also moved to measurably reduce export shipments during the last quarter of 1935 by ordering the purchase of rubber export coupons to the amount of 20,000 tons for that quarter. This is the first such move made by any of the countries involved in the restriction cartel to reduce shipments. This move, too, was instituted to counteract the excess of native exports over the allowed quota.

Goodrich Credit Union Formed

Acting independently of the management, Goodrich employes announced the opening of the Akron Equitable Federal Credit Union on October 3. The purpose of the move is to provide a convenient place where the 25,000 Goodrich workers may deposit and borrow money. The new organization has already secured a charter from the Federal Credit Union and has started to function. Although its facilities are intended for employes only, immediate members of families of employes will be permitted to open savings accounts. A credit committee, composed of three members of the office group, will have final decision on all loans. Interest on all loans will be 1% per month on unpaid balances, with security required for all loans above $50.00. James Blue is president of the new credit union.

Hold Sectional Meetings

A series of sales meetings were held last month in Chicago and New York by the Beacon Falls Rubber Footwear Division of United States Rubber Products, Inc. The new line of "Grips" for 1936 were shown and hailed at all the meetings. The salesmen are also reported favoring the Beacon Falls policy of supporting independent retailers as well as offering exclusive sales franchises wherever possible.

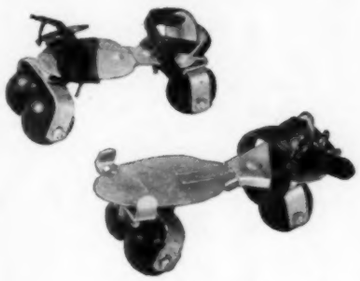
USMC Wins Safety Plaque

George C. Thomas, manager of the Beverly, Mass., factory of the United Shoe Machinery Company, was presented with a safety plaque by the Liberty Mutual Insurance Company last mony in recognition of an unusual safety record maintained by the factory during the past 15 months. During this period, which represents a total of 8,472,248 man-hours of labor, there was not a single accident in the plant.

New Rubber Goods

Baker Noiseless Skates

An innovation in roller skates has been introduced by the W. J. Baker Company, of Newport, Kentucky. Featured under the brand name of "Zephyr," these skates are made noiseless by the substitution of



wheels made of a vulcanized rubber and fibre composition in place of the ordinary iron wheels. Offered in three and four wheel styles, the front wheels are rubber-cushioned while the back wheels produce pivot-like action providing for easier turning and more flexibility than other types. Other features of the Zephyr Roller Skates include light weight, no oiling required, rigid construction, a rust-proof surface and a wheel replacement service. They are made in both adult and juvenile styles, although the latter type omit the rubber cushion at the front wheels.

D & M Gas Welding Hose

The new "Notsip" gas welding hose featured by the D & M Machine Works, of Torrance, California, is a single hose having a partition in the center with short double ends permitting the user to run gas on one side and air on the other, yet retaining all the advantages of a single

hose. Made entirely of rubber, the hose is flexible in all directions, is light in weight, and has practically no fire hazard since there are no pockets to catch and hold sparks or hot metal. It is stocked in standard lengths of 25, 50, 75 and 100 feet and is said to stand the highest pressure used in cutting with an ample margin of safety.

Vardeman Rubber Tooth Brush

A new tooth brush of rubber composition is being manufactured by the Dr. Vardeman Laboratories, Inc., of Kansas City, Mo. The rubber is impregnated with fine wool fibres to deaden the sound on the teeth that made previous rubber brushes objectionable. A small amount of cotton fibres is also incorporated as a binder, together with whitening material and pumice as an abrasive. The entire mass is milled together with a small quantity of medicinal and deodorizing oil, such as menthol and peppermint, which oozes out as the brush is employed to give a cooling and sweetening effect to the mouth of the user, as well as a slight germicidal and deodorizing action.

Musselman Bicycle Trailer

A bicycle trailer which hauls 400 pounds of fruits, vegetables, and other commodities, with minimum pedaling effort, is being merchandised by the Musselman Products Company, Cleveland, Ohio. The minimum pedaling effort is made possible by the mounting of the all-steel trailer on Musselman Doenut Airplane Tires, designed and built by A. J. Musselman, developer of the

air wheel for airplanes. The tires, 10 inches by 2¾ inches, require only 12 to 15 lbs. air pressure, and are mounted on ball-bearing disc wheels. Each tire is built to carry a weight of 250 pounds, and is constructed with an extremely flexible side wall, essential in low pressure type tires. The complete trailer weighs 60 lbs., and is 30 x 24 x 20 inches in size.

Guardian Flexible Coupling

An improved type of drive coupling for fractional horse power motors, designed to eliminate transmission of noise and motor torque vibration from the motor to the drive shaft, is being featured by the Guardian Utilities Company, Chicago. The flexible element is made of oil-resisting rubber. The new coupling is being offered in various lengths to eliminate the extra cost of shaft extensions. It is said to be

particularly suited for use with cushioned or spring motors, either base or flange mounted. It is available to order in lengths from 2½ inches up and from 5/16 to ½ inch bores.

Drybak Rubberized Game-Pockets

Made of a special chemically waterproof fabric, a line of hunting coats equipped with rubberized game-pockets is being featured by the Drybak Corporation,

of Binghamton, N. Y. The game-pockets are both blood-proof and washable. To wash them it is only necessary to pull out the rubber lining to its full extent, smooth it out on a table or flat board, and wash with ordinary soap and water. Other features of the Drybak hunting coats, similar to Model 87BP reproduced herewith, include a head-protecting storm collar, hinge sleeves, double-shell pockets, front entrances to game-pockets, and a snap-fastened inside pocket.

Rubber-Handled Cutlery

A complete line of kitchen cutlery equipped with one-piece molded rubber handles has been introduced by the Remington Arms Company, Bridgeport, Con-

necticut. Because of the one-piece molding there are no crevices for water seeping and unsanitary developments. Molded underneath the rubber is a cotton fabric for strength and shape resulting in a handle providing a sure and comfortable grip. The rubber handles are solid black combined with stainless steel rivets which appear as decorative dots giving them an attractive appearance in addition to their practicality.

Eagletex Balloon Toys

A new and novel idea in balloon toys has been introduced by the Eagle Rubber Company, Ashland, Ohio. Termed the "Eagletex" line, these balloon toys consist of a number of rubber images of familiar objects that inflate to regular balloon outlines, returning to their original shapes when deflated. The objects include a peanut, mouse, goose, bottle, shoe, bread, fish, pipe, pig, doll, dog, and others. The balloons are made available in assorted packages of different shapes and colors.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, OCTOBER 9, 1935

Crude Rubber

AFTER declining steadily during the early days of September crude rubber prices on Commodity Exchange started as equally a steady rise in the middle of the month reaching a 12 cent figure on October 4 for the first time since August 23. A price of 12.22 was quoted yesterday (October 8) the highest price since our last report. Low for the month was 11.18 quoted on September 14. The rise in crude rubber prices on the Exchange is attributed to a series of events abroad plus increased factory buying in this country. The decision of the Netherlands East Indies Government to curtail export shipments by purchasing export coupons and the exemption of estate rubber from duty payments resulted in a substantial price increase several days ago. Rubber prices have also been strengthened by the advance of other commodities due to war conditions in Ethiopia. Quotations in the outside market, Exchange, London and Singapore, follow:

As of October 9

Plantations—			
Ribbed Smoked Sheets—			
No. 1, Spot	—	@	.12¼
January-March	—	@	.12⅛
No. 2	—	@	.12
No. 3	—	@	.11⅞
No. 4	—	@	.11⅝
Thin Latex Crepe	—	@	.12⅞
Thick Latex Crepe	—	@	.12⅞
Brown Crepe, No. 1	—	@	.11⅝
Brown Crepe, No. 2	—	@	.11⅜
Amber Crepe, No. 2	—	@	.11⅜
Amber Crepe, No. 3	—	@	.11⅛
Amber Crepe, No. 4	—	@	.11⅛
Brown Crepe, Rolled	—	@	.11⅛
Latex—			
Liquid Latex, per gal.	.49	@	.50
Paras—			
Up-River, fine	—	@	.10½
Acre Bolivian, fine	—	@	.10¾
Balata—			
Block, Ciudad	—	@	.30

LONDON MARKET

Standard Smoked Sheets—Buyers—October 9

October	—	@	5 11/16d
Jan.-March	—	@	6 5/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—October 9

Oct.-Dec.	—	@	5 5/16d
Jan.-March	—	@	5 11/16d

Reclaimed Rubber

Trade in reclaims has shown a decided improvement with demands from all branches of the rubber industry increasing.

The greater manufacturing activity, coupled with the fact that reclaim prices are considered low, has resulted in many factories covering for their requirements for the balance of the year at current levels. Quotations follow:

High Tensile			
Super-reclaim, black	lb.	.08¾ @	.09
High Tensile Red	lb.	.07 @	.07¼
Shoe			
Unwashed	lb.	.06½ @	.06¾
Washed	lb.	.08 @	.09
Tube			
No. 1 (Floating)	lb.	.13 @	—
No. 2 (Compounded)	lb.	.07½ @	.07¾
Tires			
Black	lb.	.05 @	.05¼
Black, selected tires	lb.	.05¼ @	.05½
Dark Gray	lb.	.06¼ @	.06½
White	lb.	.09¼ @	.09½
Truck, Heavy Gravity	lb.	.05½ @	.06
Truck, Light Gravity	lb.	.06 @	.06¼
Miscellaneous			
Mechanical blends	lb.	.04¼ @	.04½

Scrap Rubber

Conditions in rubber scrap continue fair with improvement in demand being shown by consumers. Supplies are ample at the present time but as the winter advances these stocks will get lower and better prices are expected. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	15.00	@17.50
Mixed auto	ton	7.00	@ 8.00
Clean solid truck tires	ton	34.00	@35.00
Boots and shoes	ton	18.00	@20.00
Arctics, untrimmed	ton	14.00	@16.00
Inner tubes, No. 1	lb.	.07½ @	.07¾
Inner tubes, No. 2	lb.	.03½ @	.03¾
Inner tubes, Red	lb.	.02⅞ @	.03

Cotton

Cotton prices have marched steadily upward since our last report with few setbacks. Quoted at 10.65 early in September, high for the month was reached on October 2 when an 11.40 figure was quoted. War fears in mid-September started a European rush to cover run-down stocks with a 20 point jump in the price from 10.80 on September 17 to 11.00 on the following day. Actual fighting between Italy and Ethiopia on October 2 resulted in a 35 point jump from 11.05 to 11.40, the largest price increase recorded in a twenty-four period for the last several months. The disposition of many spinners to await easier prices caused some slowing in trade buying in the last few trading days of September. A slight reaction from the 11.40 price quoted on October 2 was caused by the announcement on October 8 that the government estimated cotton production at 11,464,000 bales which was 25,000 bales lower than the indication given on September 8. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	September 9	October 9		
	Close	High	Low	Close
October	10.41	11.06	10.96	10.98
December	10.41	11.07	10.93	10.96
March (1936)	....	11.15	11.02	11.03

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb.	.33½ @	.33¾
Peeler, carded, 23/4/3	lb.	.34½ @	.34¾
Peeler, carded, 15/3/3	lb.	.31½ @	.31¾
Peeler, carded, 13/3/3	lb.	.30½ @	.30¾
Egyptian, carded, 23/5/3	lb.	.45¾ @	.46¼
Egyptian, combed, 23/5/3	lb.	.50¾ @	.51¼
CHAFERS			
Carded, American, 1 1/32"	lb.	.33½ @	.34½
Carded, American, 1"	lb.	.30 @	.32
LENO BREAKER			
Carded, American, 1 1/16"	lb.	.34 @	.35
Carded, American, 1"	lb.	.31 @	.32

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	— @	.05¼
40x40	36 in.	6.15	lb.	— @	.04¾
40x36	36 in.	6.50	lb.	— @	.04½
48x48	40 in.	2.50	lb.	— @	.10½
48x48	40 in.	2.85	lb.	— @	.09¾
56x60	40 in.	3.60	lb.	— @	.08⅝
48x44	40 in.	3.75	lb.	— @	.07¾
44x40	40 in.	4.25	lb.	— @	.06¾

Ducks

Enameling	lb.	.32 @	.36
Belting and Hose	lb.	.32 @	—
Single filling, A grade	lb.	.16½ @	—
Double filling	lb.	.17½ @	—

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM SEPTEMBER 10 TO OCTOBER 9

Date	Spot	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Sales
Sept. 10	11.57	11.59	11.64	11.69	11.75	11.82	11.89	11.96	12.03	12.10	12.16	12.22	12.28		67
11	11.54	11.55	11.59	11.66	11.74	11.82	11.89	11.97	12.03	12.10	12.15	12.20	12.26		128
12	11.37	11.38	11.38	11.47	11.56	11.63	11.71	11.80	11.86	11.92	11.97	12.03	12.09		207
13	11.32	11.27	11.31	11.40	11.49	11.57	11.63	11.70	11.76	11.83	11.90	11.98	12.06		185
14	11.18	11.18	11.21	11.30	11.39	11.47	11.54	11.61	11.68	11.75	11.81	11.88	11.96		41
15															
16	11.21	11.20	11.22	11.31	11.40	11.48	11.55	11.62	11.68	11.74	11.80	11.86	11.93		177
17	11.26	11.22	11.25	11.34	11.43	11.51	11.58	11.65	11.71	11.78	11.83	11.88	11.94		186
18	11.30	11.28	11.34	11.43	11.52	11.60	11.67	11.74	11.80	11.87	11.94	12.01	12.08		149
19	11.37	11.30	11.34	11.44	11.54	11.62	11.69	11.76	11.82	11.88	11.94	12.01	12.08		285
20	11.50	11.45	11.50	11.59	11.68	11.76	11.83	11.91	11.98	12.05	12.10	12.16	12.22		100
21	11.48	11.43	11.48	11.57	11.66	11.74	11.81	11.88	11.94	12.01	12.07	12.14	12.21		27
22															
23	11.48	11.41	11.44	11.53	11.62	11.68	11.76	11.85	11.91	11.97	12.06	12.15	12.24		72
24	11.96	11.90	11.94	12.02	12.11	12.19	12.26	12.33	12.40	12.48	12.54	12.60	12.66		433
25	11.75	11.70	11.74	11.83	11.92	12.00	12.07	12.14	12.21	12.28	12.34	12.41	12.48		180
26	11.82	11.79	11.83	11.91	12.02	12.10	12.17	12.24	12.30	12.37	12.44	12.51	12.58		80
27	11.81	11.73	11.77	11.86	11.95	12.02	12.09	12.17	12.24	12.32	12.38	12.45	12.52		85
28	11.81	11.77	11.81	11.89	11.97	12.05	12.13	12.22	12.28	12.34	12.40	12.47	12.54		4
29															
30	11.94	——	11.90	11.98	12.06	12.12	12.20	12.28	12.34	12.41	12.48	12.55	12.62		95
Oct. 1	11.82	——	11.82	11.91	12.00	12.07	12.14	12.22	12.28	12.35	12.41	12.48	12.54	12.61	42
2	11.82	——	11.74	11.83	11.92	12.00	12.07	12.15	12.21	12.28	12.34	12.42	12.47	12.53	109
3	11.85	——	11.83	11.92	12.01	12.09	12.16	12.24	12.30	12.37	12.44	12.51	12.57	12.63	152
4	12.00	——	11.96	12.04	12.13	12.21	12.28	12.35	12.42	12.50	12.57	12.63	12.69	12.76	116
5	12.12	——	12.07	12.16	12.25	12.33	12.39	12.47	12.54	12.61	12.67	12.73	12.79	12.86	117
6															
7	12.05	——	12.03	12.12	12.22	12.29	12.37	12.44	12.50	12.57	12.63	12.70	12.76	12.84	70
8	12.22	——	12.25	12.33	12.41	12.49	12.56	12.64	12.70	12.76	12.82	12.89	12.95	13.02	202
9	12.23	——	12.23	12.31	12.40	12.48	12.55	12.63	12.69	12.76	12.83	12.91	12.97	13.04	77

Rubber CHEMICAL Markets

NEW YORK, OCTOBER 9, 1935

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.		
Zimate	lb.	.48 @	.60
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.37 @	.39
Ultramarine	lb.	.12 @	.14
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb.	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
Chromium Oxide, bbl.	lb.	.22 @	.23
Guignet's Green	lb.	.75 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b Easton	lb.	.09½ @	—
Whites			
Cryptone CD, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Cryptone, ZS-20	lb.	.10½ @	.10¾
Cryptone, ZS-86	lb.	.10½ @	.10¾
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05 @	.05¼
ZZ (leaded)	lb.	.04⅞ @	.05⅛
Anaconda, lead free	lb.	.05 @	.05¼
Horsehead Lead Free Brand:			
Special—3	lb.	.05 @	.05¼
XX Red—4	lb.	.05 @	.05¼
XX Red—72	lb.	.05 @	.05¼
XX Red—78		.05 @	.05¼
XX Red—103	lb.	.05 @	.05¼
U. S. P.—X, bbls.	lb.	.08 @	.08¼
Kadox, black label—15	lb.	.05 @	.05¼
Blue label—16	lb.	.05 @	.05¼
Red label—17	lb.	.05 @	.05¼
St. Joe, black label	lb.	.05 @	.05¼
green label	lb.	.05 @	.05¼
red label	lb.	.05 @	.05¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	— @	.06¾
Green seal—8	lb.	.06 @	.06¼
Red seal—9	lb.	.05½ @	.05¾
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.02¼ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.00 @	24.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	35.00 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	8.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Dixie, Jr.	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.08 @	—
Mica	ton	65.00 @	80.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.10½ @	.11
Zinc Stearate	lb.	.26 @	—

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	28.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.45 @	2.70
glacial, USP, bbls.	100 lb.	14.00 @	—
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.13
Stearic, double pressed	lb.	.09 @	.14
Stearite	lb.	.08 @	—
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.12½ @	—
Cottonseed, crude	gal.	.093 @	.10
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¾ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.05 @	—
Niger	lb.	.04¾ @	—
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener			
(f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.07 @	.08
coal tar	gal.	.07½ @	.08
hardwood	ton	25.00 @	30.00
pine, 200 lb. gr. wt.	bbl.	6.50 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars	gal.	.19 @	—
in drums	gal.	.25 @	.27
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.29½ @	—
Benzene, 90%	gal.	.15 @	.24
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05 @	.05¾
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.44
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.46½ @	.50½
dest. dist., drums	gal.	.45 @	.48
Waxes			
Beeswax, white	lb.	.40 @	.41
Carnauba, yellow	lb.	.39 @	.40
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02 @	.02½
White crude scale 124/126	lb.	.02 @	.02⅝
Refined, 125/127	lb.	.03¼ @	.04

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)		— @	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.23 @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½
Duphax	lb.	.09½ @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Re-exports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	10.06	23,848	5,770,109	11.23	425,615
1933:							
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698
Feb.	47,271	12,291,242	11.61	1,845	480,440	11.62	45,426
March	45,350	11,801,152	11.62	1,868	486,379	11.62	43,482
April	39,735	10,096,487	11.34	1,096	285,903	11.64	38,639
May	29,278	7,171,025	10.98	793	202,402	11.39	28,485
June	31,240	7,523,598	10.75	524	153,595	13.10	30,716
July	46,987	11,666,577	11.08	489	132,173	12.06	46,498
August	40,249	10,419,056	11.56	476	130,464	12.23	39,773

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,192	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1934:								
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503
Nov.	—	—	60	20,169	332	60,904	887	296,447
Dec.	—	—	6	2,458	192	31,947	381	184,588
1935:								
Jan.	—	—	81	34,687	448	80,097	848	287,583
Feb.	—	—	62	20,981	222	33,850	573	179,583
March	—	—	57	15,917	488	80,643	1,290	354,654
April	—	—	51	11,452	419	58,429	1,721	415,100
May	51	9,464	62	12,931	332	51,805	1,427	380,844
June	105	19,502	75	23,809	330	50,165	591	152,665
July	51	9,800	49	15,758	388	62,736	1,144	303,518
August	50	9,464	31	8,963	445	82,179	1,234	370,431

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1928	1929	1930	1931	1932	1933	1934	1935
Jan.	34,403	43,002	36,194	28,557	29,648	22,645*	39,284*	47,103
Feb.	33,702	41,594	33,302	28,797	31,821	21,392*	40,609	43,187
Mar.	35,688	44,730	35,540	32,788	29,505	17,483*	47,097	42,620
Apr.	32,772	47,521	39,686	33,321	27,518	25,928	44,853*	44,714
May	37,333	49,233	39,386	37,817	30,957	44,074	42,918*	41,568
June	37,676	43,227	34,195	37,916	41,475	50,743*	40,147*	36,623
July	37,407	41,526	29,508	31,397	29,976	49,614*	32,553*	36,384
Aug.	42,927	38,274	30,850	27,586	23,721	44,428*	33,216*	39,242
Sept.	39,882	34,707	25,515	23,638	23,847	35,281*	30,352	
Oct.	40,857	34,800	27,516	22,277	22,286	31,543*	31,347	
Nov.	37,461	27,659	23,691	22,943	23,231	28,831*	34,842	
Dec.	31,232	25,531	21,687	21,409	18,015	28,757*	36,662	
Tot.	441,340	469,804	375,980	348,986	332,000	400,719*	454,350*	

* Revised.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	% to Crude	Stocks*	Year	Production	Consumption: Tons	% to Crude	Stocks*
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,006
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.3	23,079

	Figures on Monthly Basis: Production	Tons	% to Crude	Stocks*		Production	Tons	% to Crude	Stocks*
1934:									
Jan.	9,828	7,000	17.8a	24,263	July	9,446	8,175	25.1a	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	7,268	7,775	22.3	23,999
June	10,820	9,459	23.5	23,664	Dec.	7,353	8,284	22.6	23,079
1935:									
Jan.	10,465	11,261	23.9	22,291	July	8,421	8,396	23.1	17,810
Feb.	10,072	9,374	23.3	22,989	Aug.	9,557	8,795	22.4	18,272
Mar.	10,549	9,741	22.9	20,637	Sept.	.....	.....	...	.....
Apr.	10,315	10,466	23.4	18,716a	Oct.	.....	.....	...	.....
May	10,223	9,938	23.9	18,541	Nov.	.....	.....	...	.....
June	8,590	8,710	23.8	17,932	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.
a Revised.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1933 *	1934 *	1935		1933 *	1934 *	1935
January	26,397	29,489	28,062	August	37,400	39,105	42,901
February ..	23,320	25,310	26,432	September .	34,580	34,669	
March	28,123	30,577	31,997	October	33,022	37,674	
April	29,791	32,736	36,076	November .	30,312	34,998	
May	33,709	38,071	39,089	December .	28,572	30,581	
June	37,699	36,430	37,884				
July	34,087	37,466	41,203	Total	377,003	407,106	

* Revised on basis of final annual figures issued by Bureau of Mines.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	.....

1935:		1935:		1935:	
January ...	1,868,723	May	1,561,434	September .	1,052,044
February ..	1,616,398	June	1,428,314	October ...	.....
March	1,724,077	July	1,339,353	November .	.....
April	1,907,032	August	797,827	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1933																																
June	6 5/16	6 5/16	6 7/16	—	6 7/16	6 7/16	6 5/16	6 5/16	6 5/16	6 5/16	—	6 5/16	6 5/16	5 11/16	5 5/16	5 5/16	5 5/16	—	5 11/16	5 5/16	6 5/16	6 5/16	6	5 11/16	5 11/16	6 5/16	6 5/16	6 5/16	6 5/16	6 5/16	—	6 5/16
July	6 5/16	—	—	—	—	—	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	8 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	—	7 5/16
August	7 5/16	7 5/16	—	7 5/16	—	7 5/16	7 5/16	7 5/16	7 5/16	—	7 5/16	7 5/16	—	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16
September	7 5/16	—	8	7 5/16	7	7	6 5/16	6 5/16	6 5/16	7	7 5/16	6 5/16	6 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16	7 5/16
October	7 5/16	7 5/16	7 5/16	8	7 5/16	7	8	8 5/16	7 5/16	7 5/16	8 5/16	—	—	8 5/16	8 5/16	8 5/16	8 5/16	—	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	—	8 5/16
November	7 5/16	7 5/16	8	8 5/16	7 5/16	7 5/16	8	8 5/16	7 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	9	8 5/16	8 5/16	9	8 5/16	9	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16
December	9 5/16	9 5/16	—	9 5/16	9 5/16	8 11/16	9 5/16	8 5/16	8 5/16	—	—	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	8 11/16	8 11/16	8 11/16	—	—	—	—	—	9 5/16	—	—	—
1934																																
January	—	9 5/16	8 11/16	9	9	9	—	—	8 5/16	8 5/16	8 5/16	8 5/16	8 5/16	9 5/16	9 5/16	9 5/16	8 5/16	8 5/16	9 5/16	9 5/16	9 5/16	9 5/16	9 5/16	9 5/16	10 5/16	—	10 5/16	10 5/16	10 5/16	10	10	9 15/16
February	10	9 7/16	9 11/16	—	10 5/16	10 5/16	10 5/16	10 5/16	10 5/16	10 5/16	10 11/16	—	—	10 7/16	—	—	10 5/16	10 5/16	10 5/16	10 5/16	10 5/16	10 5/16	10 5/16	—	—	10 5/16	10 5/16	10 5/16	—	—	10 5/16
March	10 7/16	10 1/2	10 1/2	—	10 5/16	10 5/16	10 5/16	10 11/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	10 11/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16
April	—	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	12	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
May	14 5/16	14 5/16	14 5/16	15	13 5/16	13 5/16	14 5/16	13 5/16	14	13 5/16	13 5/16	12 5/16	12 5/16	12 5/16	13 5/16	13 5/16	12 5/16	12 11/16	13	13	13	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
June	13	14	14 5/16	15	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	14 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
July	14	14 5/16	15	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
August	14 11/16	14 5/16	13 5/16	15 5/16	15 11/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	14 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16	15 5/16
September	14 5/16	14 5/16	13 5/16	14	13	13 5/16	13 5/16	14	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	14	14 5/16	14 5/16	12 3/4	13	12 5/16	12 5/16	12 5/16	13	13	13 5/16	13 5/16	13	13	13	13
October	13 5/16	13	12 5/16	13	13	13 5/16	13 5/16	13 5/16	13 5/16	12 11/16	12 5/16	12 11/16	12 5/16	12 11/16	13	—	12 5/16	12 11/16	12 3/4	12 3/4	12 11/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	13 5/16	13 5/16	13
November	13 5/16	13 5/16	13	13	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
December	13 5/16	—	12 7/16	13	13	13 5/16	13 5/16	13 7/16	—	12 11/16	12 5/16	12 11/16	12 5/16	12 11/16	13	—	12 5/16	12 11/16	13	13	12 11/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	13 5/16	13 5/16	13
1935																																
January	—	13 5/16	13 5/16	13 5/16	13 5/16	—	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	—	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	12 11/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
February	12 3/4	12 3/4	12 5/16	12 3/4	12 3/4	12 5/16	12 5/16	13 5/16	13 5/16	—	13	13 5/16	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
March	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12	12 5/16	13 5/16	12	13 5/16	13 3/4	13 5/16	13	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16	13 5/16
April	11 5/16	11 5/16	11 5/16	11 5/16	11	11 5/16	12 5/16	12 5/16	12	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
May	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16
June	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
July	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
August	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16	12 5/16
September	12 5/16	12 5/16	11 5/16	11 11/16	11 5/16	12 5/16	11 11/16	12	12	11 5/16	11 5/16	12 5/16	12	11 5/16	12	12	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	12	12	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16	11 5/16
October	11 11/16	11 5/16	11 5/16	12	12 5/16	11 5/16	12 5/16	12 5/16	12 1/4	11 5/16	11 5/16	12 5/16	12	11 5/16	12	—	11 5/16	11 5/16	11 5/16	11 1/2	11 5/16	12	12	11 5/16	11 5/16	12	11 5/16	11 5/16	11 5/16	—	—	11 1/2

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.22	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	20.14	15.24	8.34	4.38	3.08	9.32	13.10
Feb.	23.7	15.85	7.70	4.03	2.95	10.45	12.92
Mar.	24.55	15.34	7.71	3.35	3.01	11.01	11.51
Apr.	21.18	14.93	6.43	3.02	3.56	12.10	11.55
May	21.46	14.24	6.49	3.09	4.95	13.26	12.05
June	20.64	12.45	6.35	2.66	6.15	13.51	12.57
July	21.30	11.24	6.37	2.89	8.01	14.60	12.10
Aug.	20.59	9.96	5.38	3.63	7.31	15.47	11.98
Sept.	20.37	8.28	5.08	3.84	7.30	15.36	11.55
Oct.	19.67	8.20	4.87	3.65	7.64	13.96	
Nov.	16.62	9.01	4.65	3.44	8.66	13.04	
Dec.	16.12	9.05	4.64	3.24	8.87	12.98	
Average for Year	20.55	11.98	6.17	3.49	5.96	12.92	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	July	Aug.	Sept.	Oct.	Day	July	Aug.	Sept.	Oct.
1	5 1/16	5 1/16	—	5 1/16	17	5 1/16	—	5 3/16	
2	5 1/16	5 1/4	5 3/16	5 5/16	18	5 1/4	—	5 3/16	
3	5 7/16	—	5 3/16	5 1/16	19	5 1/16	5 5/16	5 7/16	
4	5 1/16	—	5 7/16	5 1/16	20	—	5 5/16	5 1/2	
5	5 1/16	—	5 1/2	5 1/16	21	—	5 1/16	5 7/16	
6	—	5 1/16	5 7/16	—	22	5 1/4	5 1/16	—	
7	—	5 1/4	5 7/16	5 1/16	23	5 1/4	5 1/16	5 7/16	
8	5 1/16	5 1/4	—	5 1/16	24	5 5/16	—	5 3/4	
9	5 1/16	5 1/4	5 1/2	—	25	5 3/4	—	5 1/16	
10	5 7/16	—	5 7/16	—	26	5 5/16	5 1/16	5 3/4	
11	5 7/16	—	5 1/2	—	27	—	5 5/16	5 1/16	
12	5 1/16	5 3/4	5 7/16	—	28	—	5 5/16	5 3/4	
13	—	5 1/16	5 5/16	—	29	5 1/16	5 1/16	—	
14	—	5 1/16	5 5/16	—	30	5 3/4	5 5/16	5 3/4	
15	5 7/16	5 1/16	—	—	31	5 1/16	—	—	
16	5 3/4	5 1/16	5 7/16						

Average Monthly Price Per Pound

Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence	Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Jan.	3.052	2.264	4.429	6.434	Aug.	2.654	3.811	7.401	5.696
Feb.	2.760	2.093	4.920	6.292	Sept.	2.485	3.728	7.409	5.508
Mar.	2.047	2.099	5.136	5.745	Oct.	2.425	3.957	6.806	
Apr.	1.876	2.323	5.712	5.604	Nov.	2.518	4.096	6.294	
May	1.825	2.966	6.207	5.822	Dec.	2.444	4.200	6.295	
June	1.750	3.392	6.245	6.027	Average for				
July	1.875	3.860	7.053	5.801	Year	2.434	3.233	6.159	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Aug.	Sept.	Oct.	Date	Aug.	Sept.	Oct.	Date	Aug.	Sept.	Oct.
1	12.00	—	11.05	11	—	10.85		21	11.65	10.80	
2	11.95	—	11.40	12	11.50	10.80		22	11.70	—	
3	11.90	10.65	11.30	13	11.35	10.75		23	11.10	10.85	
4	—	10.70	11.35	14	11.55	10.65		24	10.85	10.90	
5	11.90	10.65	11.35	15	11.70	—		25	—	10.90	
6	11.95	10.75	—	16	11.75	10.65		26	10.85	10.85	
7	11.85	10.70	11.40	17	11.80	10.80		27	11.05	10.75	
8	11.65	—	11.30	18	—	11.00		28	10.95	10.75	
9	11.60	10.75	11.30	19	11.80	11.00		29	10.80	—	
10	11.60	10.85		20	11.70	10.95		30	10.75	10.80	
								31	10.65	—	

Average Monthly Price Per Pound

	1932 Cents	1933 Cents	1934 Cents	1935 Cents		1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	6.65	6.23	11.25	12.70	Aug.	7.43	9.55	13.40	11.48
Feb.	6.85	6.05	12.28	12.58	Sept.	6.30	9.64	13.00	10.80
Mar.	6.86	6.39	12.30	11.63	Oct.	6.30	9.58	12.48	
Apr.	6.16	7.02	11.80	11.73	Nov.	6.22	10.04	12.53	
May	5.72	8.64	11.44	12.25	Dec.	6.00	10.17	12.76	
June	5.02	9.47	12.20	11.89	Average for				
July	5.87	10.76	12.84	12.26	Year	6.41	8.63	12.36	

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1933	1934	1935	AFLOAT 1933	1934	1935	ON HAND AND AFLOAT 1933	1934	1935
Jan.	396,376	368,660	346,084	32,539	45,768	42,066	428,915	414,428	388,150
Feb.	381,794	358,681*	339,335*	32,898	53,063	42,969	414,692	411,744*	382,304*
Mar.	390,135	352,897*	338,700	29,531	54,722	44,485	419,666	407,619*	383,185
Apr.	382,167	351,073*	334,954	30,745	56,251	37,651	412,912	407,324*	372,605
May	364,623	350,935*	319,281	43,342	57,921	44,375	407,965	409,250	363,656
June	333,954	358,461*	320,470	63,608	46,698	55,581	397,562	404,847	376,051
July	326,609	365,072	330,528	57,435	45,869	49,018	384,044	410,941	379,546
Aug.	325,148	363,711*	329,548	53,084	40,278	47,724	378,232	403,989*	377,272
Sept.	334,637	359,667		57,255	38,831		391,982	398,498	
Oct.	343,579	362,018		58,568	38,247		402,147	400,265	
Nov.	353,852	361,236		57,140	38,625		410,992	399,861	
Dec.	364,541	352,632		55,606	47,644		419,147	400,276	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1933	1934	1935	At end of	1933	1934	1935
Jan.	36,481	38,570	81,807	July	41,178	50,490	99,226
Feb.	37,182	38,752	87,605	Aug.	39,480	48,953	101,574
Mar.	40,689	40,501	92,664	Sept.	39,237	56,103	
Apr.	40,911	42,413	94,361	Oct.	37,101	63,079	
May	41,998	42,190	95,722	Nov.	36,139	67,656	
June	43,032	45,674	98,077	Dec.	35,615	72,285	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1935					
May	95,138	95,454	96,097	96,962	
June	96,067	96,463	96,749	97,385	97,112
July	98,302	98,784	97,934	98,342	
Aug.	98,950	99,423	100,533	99,860	100,972
Sept.	101,246	101,709	101,357	100,542	

Stocks in Liverpool

1935				
May	71,488	71,278	71,673	72,027	
June	71,839	72,605	73,338	73,569	73,257
July	74,211	74,527	74,250	74,766	
Aug.	74,948	75,778	75,752	75,503	75,733
Sept.	76,012	76,303	76,396	76,416	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1932	1933	1934	1935	End of	1932	1933	1934	1935
Jan.	48,850	22,525	40,405	50,588	July	17,017	36,972	65,099	41,266
Feb.	46,954	21,530	41,884	51,628	Aug.	20,649	38,601	59,227	36,117
Mar.	46,591	24,594	47,933	46,046	Sep.	20,415	36,948	54,905	
Apr.	39,663	25,460	48,431	43,295	Oct.	23,158	37,282	54,155	
May	38,690	29,822	76,393	45,625	Nov.	25,419	39,018	49,282	
June	19,770	34,676	73,218	43,866	Dec.	25,341	38,269	51,255	

STOCKS IN OTHER CENTRES

End of: 1934	Malaya Mainland	Holland	Colombo	Para and Manaos
Nov.	33,590	1,404	5,631	3,081
Dec.	23,173	1,326	5,732	3,293
Jan., 1935	33,609	1,397	5,926	3,477
Feb.	32,062	1,534	4,753	3,153
Mar.	31,844	1,551	3,917	3,214
Apr.	33,583	1,536	4,245	3,019
May	31,896	1,499	4,910	2,643
June	33,823	1,481	4,659	2,012
July	33,949	1,448	4,700	1,222
August	30,660	1,455	4,866	

RUBBER STOCKS AFLOAT

End of: 1934	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
May	57,921	39,370	43,854	141,145
June	46,698	36,870	26,910	110,478
July	45,869	35,430	15,355	96,654
August	40,278	36,060	21,001	97,349
September	38,831	39,630	35,215	113,716
October	38,247	40,560	20,061	98,868
November	38,625	39,870	21,342	99,837
December	47,644	41,200	36,132	124,976
End of: 1935				
January	42,066	35,600	35,334	113,000
February	42,969	28,750	31,281	103,000
March	44,485	30,400	17,115	92,000
April	37,651	31,400	28,949	98,000
May	44,375	30,300	28,325	103,000
June	55,581	27,485	16,934	100,000
July	49,018	28,000P	17,982	95,000
August	47,724	28,000P	19,276	95,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

P—Preliminary estimate

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	64,439	77,944	68,726	50,965	48,739	40,085	45,304	47,233
Shipments	64,059	74,296	69,395	53,638	48,151	40,260	44,094	46,687
Inventory[2]	10,264	13,624	11,838	9,003	7,775	7,644	8,888	9,455

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,258	3,922	4,626	2,597	3,222	3,663	7,237	9,684	10,398
Feb.	2,339	4,335	4,383	2,292	3,285	3,287	7,377	10,725	11,530
Mar.	2,038	5,180	4,346	2,092	4,223	4,204	7,290	11,651	11,675
Apr.	3,123	4,470	4,512	3,654	4,438	5,144	6,778	11,981	11,003
May	5,189	4,456	4,175	5,180	5,332	4,067	6,760	11,127	11,131
June	6,100	4,342	3,910	6,305	5,228	4,262	6,615	10,219	10,755
July	5,714	3,353	3,532	5,497	4,157	5,447	6,844	9,437	8,850
Aug.	4,994	3,533		4,707	4,308		7,070	8,697	
Sept.	3,999	2,936		3,503	3,183		7,595	8,419	
Oct.	3,249	3,287		2,537	3,010		8,462	8,657	
Nov.	3,039	3,341		2,197	3,191		9,247	8,779	
Dec.	3,082	3,778		3,531	3,109		8,888	9,455	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	70,823	80,180	68,829	52,420	48,333	36,891	42,546	46,228
Shipments	72,896	77,127	70,592	54,938	50,021	37,911	41,391	45,046
Inventory[2]	13,692	16,117	12,807	9,999	7,922	6,749	7,815	9,180

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,093	3,530	4,259	2,535	3,199	3,722	6,197	8,403	9,621
Feb.	2,224	4,077	4,171	2,102	3,323	3,362	6,357	8,445	10,466
Mar.	1,883	5,194	4,123	1,902	4,118	4,168	6,369	10,244	10,406
Apr.	2,853	4,735	4,259	3,051	4,342	4,453	6,189	10,585	10,170
May	5,189	4,359	3,892	5,180	4,902	3,451	6,760	10,043	10,615
June	5,448	4,097	3,480	5,778	5,309	4,024	6,097	8,795	10,050
July	5,603	3,531	3,251	5,211	4,323	5,269	6,440	8,053	8,005
Aug.	4,916	3,680		4,687	4,198		6,628	7,555	
Sept.	3,827	3,110		3,472	3,024		7,008	7,639	
Oct.	3,506	3,219		2,676	2,689		7,831	8,151	
Nov.	2,863	3,169		2,103	2,767		8,625	8,503	
Dec.	2,631	3,503		3,410	2,850		7,815	9,180	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,778,739	2,190,099	588,640	116,890	92,538	24,352	2,895,629
1934							
August*	234,810	183,500	51,310	9,904	7,325	2,579	244,714
Sept.*	168,871	123,909	44,962	5,579	4,211	1,368	174,450
Oct.*	132,491	84,503	47,988	3,780	2,125	1,655	136,271
Nov.*	78,465	45,556	32,909	1,697	1,052	645	80,162
Dec.	183,187	128,059	55,128	2,732	2,334	398	185,919
1935							
Jan.*	292,817	229,233	63,584	10,607	8,269	2,338	303,424
Feb.*	335,699	275,623	60,076	18,114	13,885	4,229	353,813
March*	429,834	361,816	68,018	21,975	18,179	3,796	451,809
April*	477,746	401,628	76,118	24,121	20,686	3,435	501,867
May*	364,727	307,522	57,205	20,765	17,093	3,672	385,492
June*	361,321	296,609	64,712	15,745	12,276	3,469	377,066
July*	337,044	276,084	60,960	13,069	9,471	3,598	350,113
Aug.	240,051	182,389	57,662	7,692	5,524	2,168	247,743

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [5]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1933:															
Aug.	52,436	17,869	34,567	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	323	75,114
Sept.	49,607	15,146	34,461	5,111	125	1,027	727	611	5,868	9,164	15,005	1,702	656	274	74,731
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,426	965	314	85,131
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,303	6,684	9,951	14,474	1,553	956	366	78,127
Dec.	57,579	18,110	39,469	7,435	964	989	750	1,046	7,030	10,183	17,274	3,779	930	302	90,151
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	334	76,676
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	239	98,033
1935															
Jan.	56,720	17,142	39,578	5,202	2,269	1,630	1,222	2,614	3,812	5,371	8,704	2,650	1,196	460	74,719
Feb.	50,593	17,676	32,917	5,556	731	1,887	760	2,288	4,395	7,663	15,194	2,076	636	254	74,154
Mar.	47,407	13,437	33,970	3,181	701	1,901	773	2,076	5,592	7,950	7,973	1,472	740	526	66,855
Apr.	53,360	16,029	37,331	2,976	370	1,895	846	1,661	5,574	6,873	12,683	2,827	963	185	74,957
May	51,353	23,720	27,633	4,223	674	2,323	848	2,752	6,217	7,931	21,058	2,138	832	315	76,920
June	49,751	18,637	31,114	3,525	1,077	2,031	603	2,869	5,698	8,258	14,168	2,021	659	300*	72,323
July	48,975	11,257	37,718	4,106	580	1,870	1,164	1,939	5,899	5,664	8,373	2,015	427	300*	70,055
Aug.	51,873	10,978	40,895	5,683	724	759	566	2,062	4,661	6,923	8,875	2,451	500*	300*	74,399
Sept.	51,247	10,418	40,829												

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,024	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	142	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296	3,681	798	693	447	813	675	254	70,719
Nov.	35,982	15,875	3,176	3,425	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904	1,979	6,460	1,312	—168	139	1,143	615	762	60,928
1935															
Jan.	39,546	20,383	5,573	4,286	2,670	4,400	1,613	3,446	1,099	419	158	1,252	468	1,245	86,558
Feb.	45,999	15,609	4,593	3,513	1,558	5,582	4,356	1,810	848	399	477	838	567	1,836	87,985
Mar.	44,772	12,810	4,017	6,353	2,710	4,421	1,582	4,624	1,459	240	331	891	630	741	85,581
Apr.	40,061	11,574	3,306	5,820	1,063	6,635	1,653	3,387	1,150	520	329	1,049	432	789	78,115
May	29,962	12,498	3,828	6,049	3,929	5,429	935	1,937	671	982	272	853	815	774	68,934
June	31,410	10,253	3,210	4,551	1,435	3,373	1,831	3,087	496	1,065	446	780	745	604	66,286
July	47,694	9,454	3,247	4,929	1,319	4,484	1,298	1,823	520	572	157	800	548	185	77,030
Aug.	41,057	14,120		4,790	2,692				655		413				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-22, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
The RUBBER SERVICE Laboratories Co.
1012 Second National Bldg., Akron, Ohio
A Division of MONSANTO Chemical Wks.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 25 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CADMIUM REDS
In 6 Shades . . Deep Orange to Extra Dark Red
LITHOPONES
Standard and Titanated
United Color and Pigment Co., Inc.
Newark, New Jersey
Branches in Principal Cities

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

THE RUBBER AGE
250 West 57th St.. New York

CABOT CERTIFIED CARBON BLACK
"Spheron"
Godfrey L. Cabot, Inc.
77 Franklin St. Boston, Mass.

CARBON BLACK—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
DISPERSO . . . *the specially developed Carbon Black that gives* BETTER DISPERSION.
WISHNICK-TUMPEER, INC.
295 Madison Ave., New York

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
For Rubber — For Industry Generally
Accelerators — *Acids* — *Latex*
Antioxidants — *Oil of Myrbane* — *Lotol*
Specialties — *Aniline Oil* — *Dispersions*
NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS and compounding ingredients; Clay, Accelerators, Mineral Rubber.
R. T. Vanderbilt Co.
230 Park Ave. New York City

CHEMICALS and Mineral Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
Heveatex Corporation
78 Goodyear Ave., Malrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
The RUBBER SERVICE LABORATORIES CO.
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Akron, Ohio

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